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An examination of Marine Corps energy initiatives and the supporting manpower force structure

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THESIS

AN EXAMINATION OF MARINE CORPS ENERGY INITIATIVES AND THE SUPPORTING MANPOWER FORCE STRUCTURE

by

Jessica M. Wall

March 2016

Thesis Advisor: Bill Hatch
Co-Advisor: Chad Seagren

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This research is in response to a request from the United States Marine Corps Expeditionary Energy Office. The Marine Corps has identified its reliance on energy resources as a real threat to military security and a drag on the logistics tail of expeditionary operations. This research recommends that the Marine Corps prioritize development of the existing Unit Energy Manager program to address operational energy capability requirements. Long-term solutions require updating existing formal training and education standards and assignment of a new free military occupational specialty on the Marine Corps tables of organization. The Expeditionary Energy Office and Marine Corps Installations Command have stood up to centrally manage policy and directives for Marine Corps energy management; however, the organization has not institutionalized mission essential tasks nor developed personnel training in order to field operational energy managers to the fleet. This research identifies the federal and military policies and guidance in place to manage operational and installation energy issues, as well as the manpower billets in place to support centralized management. The research further examines the existing force structure that supports training of energy management professionals within the Marine Corps.

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AN EXAMINATION OF MARINE CORPS ENERGY INITIATIVES AND THE SUPPORTING MANPOWER FORCE STRUCTURE

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LIST OF ACRONYMS AND ABBREVIATIONS

1stLt	First Lieutenant
2ndLt	Second Lieutenant
A/C	Air Conditioning
ADOS	Active Duty Operational Support
AEE	Association of Energy Engineers
ALNAV	All Navy
ASR	Authorized Strength Report
BAH	Booze Allen Hamilton
BEyOnD	Behavioral Energy Operations Demonstration
BIC	Billet Identification Code
BLS	Bureau of Labor and Statistics
C2	Command and Control
C4I	Command, Control, Communications, Computers, and Intelligence
Capt	Captain
CBA	Capabilities Based Assessment
CDD	Capabilities Development Directorate
CEB	Combat Engineer Battalion
CEM	Certified Energy Manager
CERP	Commander's Energy Readiness Program
CG	Commanding General
CLB	Combat Logistics Battalion
CMC	Commandant of the Marine Corps
CO	Commanding Officer
CTR	Contractor
CWO	Chief Warrant Officer
DC CD&I	Deputy Commandant for Combat Development and Integration
DC I&L	Deputy Commandant for Installations and Logistics
DOD	Department of Defense
DoDI	Department of Defense Instruction
DON	Department of the Navy
DOTMLFP	Doctrine, Organization, Training, Materiel, Leadership & Education, Personnel and Facilities
DUERS	Defense Utility Energy Reporting System
E2C	Expeditionary Energy Concepts
E2O	Expeditionary Energy Office
E2W2	Expeditionary Energy, Water, and Waste
EAR	Energy Audit Report

EEA	European Environmental Agency
EERP	Expeditionary Energy Readiness Program
EF21	Expeditionary Force 21
EMA	Energy Management Association
EMIT	Energy Manager in Training
EMP	Energy Management Professional
EMS	Energy Management Society
EOS	End of Service
EP	Energy Program
eROI	Energy Return on Investment
ESB	Engineer Support Battalion
EWS	Expeditionary Warfare School
ExFOB	Experimental Forward Operating Base
FTE	Full Time Equivalent
FY	Fiscal Year
G-3	Operations Section
G-4	Logistics Section
G-5	MAGTF Planning Section
Gen	General
GF-1	Facilities Office
GS	General Schedule
GySgt	Gunnery Sergeant
HM/HW	Hazardous Material/Hazardous Waste
HQMC	Headquarters Marine Corps
HRDP	Human Resource Development Process
HSI	Human Systems Integration
ICD	Initial Capabilities Document
IEM	Installation Energy Manager
I&L	Installations and Logistics
JCIDS	Joint Capabilities Integration and Development System
JWRMAG	Joint Water Resources Management Action Group
KSA	Knowledge, Skills, and Abilities
LNO	Liaison Officer
LtCol	Lieutenant Colonel
MAGTF	Marine Air Ground Task Force
MARADMIN	Marine Administration
MARDIV	Marine Division

MCAGCC	Marine Corps Air Ground Combat Center
MCICOM	Marine Corps Installation Command
MCIEAST	Marine Corps Installations East
MCINCR	Marine Corps Installations North Capitol Region
MCIPAC	Marine Corps Installations Pacific
MCIWEST	Marine Corps Installations West
MCLB	Marine Corps Logistics Base
MCO	Marine Corps Order
MCTL	Marine Corps Task List
MEB	Marine Expeditionary Brigade
MEF	Marine Expeditionary Force
MET	Mission Essential Task
METL	Mission Essential Task List
MGySgt	Master Gunnery Sergeant
MILPERSMAN	Military Personnel Manual
MLG	Marine Logistics Group
MPT&E	Manpower, Personnel, Training, and Education
MOS	Military Occupational Specialty
M&RA	Manpower and Reserve Affairs
MROC	Marine Corps Requirements Oversight Council
MSC	Major Subordinate Command
MSE	Major Subordinate Element
MSgt	Master Sergeant
MTVR	Medium Tactical Vehicle Replacement
MWSS	Marine Wing Support Squadron
NAVMC	Navy and Marine Corps
NAVSEA	Naval Sea Systems Command
NAVSUPINST	Navy Supplementary Instruction
NCO	Non-Commissioned Officer
NOBC	Naval Officer Billet Classification Code
NPS	Naval Postgraduate School
OPM	Office of Personnel and Management
P2T2	Patients, Prisoners, Trainees, and Transients
P&R	Programs and Resources
PM E2S2	Project Manager Expeditionary Energy & Sustainment Systems
PMOS	Primary MOS
POM	Program Objective Memorandum
PPBE	Planning, Programming, Budget and Execution
REWAC	Regional Energy and Water Advisory Center
S&T	Science and Technology

SECNAV	Secretary of the Navy
SECNAVINST	Secretary of the Navy Instruction
SME	Subject Matter Expert
SNCO	Staff Non-Commissioned Officer
SOC	Standard Occupational Classification
SOP	Standard Operating Procedures
SPM	Squad Power Manager
SSgt	Staff Sergeant
TACMN	Table of Authorized Materiel Control Numbers
TECOM	Training and Education Command
TFSMS	Total Force Structure Management System
T&E	Training and Education
T/E	Tables of Equipment
T/O	Tables of Organization
T&R	Training and Readiness
UEM	Unit Energy Manager
UIC	Unit Identification Code
USMC	United States Marine Corps
WO	Warrant Officer

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I. INTRODUCTION

A. BACKGROUND

Continuing scientific research regarding global warming trends and the impact of human energy consumption has influenced world leaders to work together to announce energy reduction goals. In 2015, President Barack Obama signed an official proclamation announcing October as Energy Action Month. The proclamation encouraged citizens and the federal government to reduce consumption and dependence on foreign fuel and invest in the global energy reduction campaign. In 2009 and again in 2012, in compliance with executive orders and National Security Strategy, the Secretary of the Navy (SECNAV) directed the Department of the Navy (DON) and Marine Corps to develop and manage energy efficiency initiatives. Initiatives directed components of the Department of Defense (DOD) to reduce consumption and emissions and to become energy independent. In 2012, SECNAV tasked the Commandant of the Marine Corps (CMC) with execution of all DON energy policies and assignment of personnel to manage new energy programs (Department of the Navy [DON], 2012a). Well ahead of this guidance, in 2009, Headquarters Marine Corps (HQMC) established the Expeditionary Energy Office (E2O) to manage and report annual energy use and reductions. Marine Corps Installations Command (MCICOM) also stood up in 2012 to centrally manage installation requirements. In concert with SECNAV instructions, the E2O and MCICOM worked jointly to carry out the *Marine Corps Expeditionary Energy Strategy and Implementation Plan: Bases to Battlefields*.

Advances in technology and equipment have led to an increase in the Navy and Marine Corps' global energy footprint. In the strategy and implementation plan, HQMC (2011a) concluded that "since the Vietnam conflict, there has been a 175% increase in gallons of fuel consumed per U.S. Soldier, Sailor, and Marine per day, for an average annual increase of about 2.6 percent in the last 40 years" (p. 8). Significant growth in energy demand increases the logistics tail required to support the operational commander and threatens the security of expeditionary forces concerning time and movement. General James F. Amos, 35th Commandant of the Marine Corps, warned that "by tethering our operations to vulnerable supply lines, it degrades our expeditionary capabilities and ultimately puts Marines at risk. To maintain our lethal edge, we must change the way we use energy" (HQMC, 2011a, p. 3). To that end, the

Navy and Marine Corps have acknowledged the threat of energy dependence, and through recent initiatives, have developed goals to become energy independent.

Decreasing defense reliance on fuel and energy requirements reduces the logistics requirement and strengthens military security. Development of goals, implementation of initiatives, management of resources, and collection and reporting data—all require manpower resources. HQMC made significant strides in energy oversight with the creation of the E2O and MCICOM; however, for the energy strategies to be successful, sufficient manpower and personnel must be assigned to address the capability gaps identified in energy management practices.

B. PROBLEM

The establishment of an energy foundation through manpower requirements in support of an energy strategy is essential. Prior to the publication of the strategy and implementation plan (HQMC, 2011a), operational energy management was not assigned to any particular person or billet. Management occurred at the unit or installation level through consumption and requirement generation by personnel in relevant billets. Supervision or centralized management in some respects occurred at the Marine Expeditionary Force (MEF) G-3 or G-4, managing and coordinating the purchase of fuel for MEF-level exercises. Marines and their civilian counterparts with roles in energy management typically worked at the installation in environmental, bulk fuels, and facilities offices. Acquisition professionals assigned to Marine Corps bases (or augmenting MEF exercises) also contribute to the purchase of fuel, electricity, and other energy consumption requirements.

No specific billet existed for a dedicated and centralized operational energy manager to ensure maximum waste reduction and optimal usage of available energy sources. Each Marine or civilian managed his or her energy requirement in accordance with standard operating procedures (SOP) and needs of the unit commander. This led to long-term implications—significant consumption and energy waste with little to no accountability at the unit or enterprise level. Lack of accountability and oversight meant lost capability in terms of dollars wasted, as well as delays and restrictions to operational movements and constriction of logistical resources.

C. PURPOSE

The E2O has sponsored this research to evaluate the manpower requirements needed to manage the Marine Corps' specific energy initiatives. The purpose of the thesis is to examine the Marine Corps' energy program for manpower and personnel requirements. The thesis evaluates the Marine Corps' specific energy initiatives, with particular emphasis on identification of military occupational specialty (MOS) training, MOS responsibilities, and billet assignment on the Tables of Organization (T/O). Specific MOS or BIC assignments may be essential when establishing Marine Corps energy programs. A permanent MOS or billet signals from the CMC that energy management requires specific skills rather than just another collateral duty. This thesis determines the force structure requirements needed to manage USMC energy initiatives as required by DON policy and makes recommendations for change or incorporation of new manpower structural support, as applicable.

D. RESEARCH QUESTIONS

1. Primary Question

How can Marine Corps manpower total force structure support SECNAV and USMC energy initiatives?

2. Secondary Questions

What are the policies and directives that support Marine Corps energy management and execution?

What military, civilian, or contractor occupations support the requirements of the Department of Defense and Department of Navy and Marine Corps energy programs?

What work does the Marine Corps accomplish that expends energy and requires management?

E. SCOPE

The scope of the study includes 1) a review of the Marie Corps total force structure process; 2) review of occupational standards and position descriptions related to energy management; 3) review of the USMC tables of organization to determine existing billets by

MOS and organization; and a 4) review of organizational elements and their demand for personnel in energy-related capacities. The research reviews both installation (bases and stations) and expeditionary (operational units in garrison or deployed) requirements. The study is limited to an analysis of the Marine Corps, but the research is applicable to the study of energy management within any organization.

F. ORGANIZATION OF THE STUDY

The remainder of the study is organized as follows:

Chapter II provides a thorough background of Navy and Marine Corps requirements and energy strategy implementation, and introduces energy plans in place and capability gaps that require manpower attention. The chapter provides a review of ethos campaigns developed to promote cultural change. It reviews current management practices, training, education, and assignments. The literature review includes synthesis of academic research in the field of organizational change and energy management.

Chapter III introduces the Marine Corps Total Force Structure Process. The chapter examines MOSs relevant to operational energy management and associated MOS responsibilities and training requirements. In addition, the chapter examines the T/O and energy management positions that are in place. Finally, it identifies E2O, I&L, and MCICOM regional organizational structures, and examines rank distribution of the Unit Energy Manager program.

Chapter IV introduces the thesis results. Three courses of action are offered to support Marine Corps energy management initiatives using the manpower total force structure process. The options are ranked in terms of cost and risk, as well as matriculation of energy managers into the fleet.

The final chapter provides a summary of the research as well as recommendations for further action or study.

II. BACKGROUND AND LITERATURE REVIEW

A. INTRODUCTION

This chapter provides background material as well as an academic literature review of relevant research. The background material review consists of an overview of DON and USMC energy-related publications, program implementation documents, and other relevant program information pertaining to awards, recognition, and culture. The chapter reviews literature regarding manpower force structure within the Navy and Marine Corps. The literature review also discusses creating cultural change in lieu of a personnel or material solutions and research related to energy management positions in corporate organizations and the Army.

B. BACKGROUND

Several DON and Marine Corps publications influence the management of energy efficiency. Both branches of the service have taken a top-down approach. Leadership at the highest levels has directed the naval organizations to implement energy management programs and develop a culture of personal accountability within the ranks. This chapter introduces the documents critical to the Marine Corps' implementation plans and how they are relevant to the review of manpower force structure requirements. Information relevant to the discussion is grouped into the following categories:

- policy and directives
- energy reduction plans
- cultural change
- awards and recognition programs
- management theory or practice
- training and education

1. Overview of Policy and Directives

Federal and military organizations published energy-related policy and directives at different times and not always in a consecutive or subsequent fashion. Oftentimes, subordinate organizations published documents before their parent organizations. To assist the reader in

identifying published documents, a list of references categorized by strategy, policy, operational or installation level guidance as introduced in the thesis is shown in Figure 1.

Figure 1. Energy Management References Introduced in the Thesis

Strategy

- *DOD Energy for the Warfighter: Operational Energy Strategy* (2011)
- *DOD Operational Energy Strategy: Implementation Plan* (2012)
- *U.S. Marine Corps S&T Strategic Plan* (2012)
- *Marine Corps Vision and Strategy 2025* (2013)
- Executive Order: Planning for Federal Sustainability in the Next Decade (2015)
- Presidential Proclamation – National Energy Action Month (2015)
- *Expeditionary Force 21* (EF 21) (2015)

Policy

- MCO P11000.9C with Change 4, Real Property Facilities Manual, Volume VI (1991)
- *DOD Energy Manager's Handbook* (2005)
- DODI: Installation Energy Management (2009)
- SECNAV INSTRUCTION 4101.3 (2012)
- OPNAV INSTRUCTION 4100.5E (2012)
- MCO 3900.19 Applying Energy Performance Metrics and Measures in Requirements Development and Acquisition Decision-Making (2013)
- DODD 4180.01 DOD Energy Policy (2014)

Operational Guidance

- USMC Expeditionary Energy Strategy and Implementation Plan: "Bases-to-Battlefields" (2011)
- Initial Capabilities Document (ICD) for USMC Expeditionary Energy, Water, and Waste (E2W2) (2011)
- Experimental Forward Operating Base (ExFOB) Charter (2012)
- Commander's Energy Readiness Program (2014)
- *Commandant's Planning Guidance* (2010, 2015)

Installation Guidance (DC, I&L/MCICOM)

- Energy Ethos Campaign (2014)
- *IEM Handbook* (2015)
- *UEM Handbook* (2015)
- MARADMIN 114/15 Energy Ethos Campaign and Unit Energy Manager (UEM) Program (2015)
- *United States Marine Corps Installations Energy Strategy* (2015)

In 2014, the DOD published an updated energy policy, directing the secretaries of the military services to develop and implement energy doctrine and continuously seek improvement in energy performance across platforms, weapons, installations, and operational units. DOD's (2012) O*perational Energy Strategy* called for more options and capabilities while at the same time lowering risk and costs and reducing the overall fuel requirement. Target number seven of the plan specifically directed military departments to report their policy, doctrine, and education plans to reduce energy demand and support future force requirements (p. 9). In 2012, the DON (2012a) released SECNAVINST 4101.3, directing the CMC to assign appropriate personnel to support development of energy programs as well as to appoint energy personnel to assist with the Program Objective Memorandum (POM). The instruction also directed the development of energy training standards and training materials, as well as an annual review of effectiveness. The DON and Marine Corps leadership acknowledged in these documents the requirements for manpower, personnel, training, and education (MPT&E).

In OPNAVINST 4100.5E, the DON (2012b) cites its policy objectives for meeting shore-based energy efficiency goals. Shore-based goals centered on reducing consumption, increasing use of alternative fuels, producing and procuring renewable energy sources, installing metering devices to gauge use and waste, promoting sustainable resources, and evaluating programs annually. The document also introduced the idea of energy Return on Investment (eROI), the intent of which was to ensure all new energy initiatives reap some form of return in the long run. The DON (2012b) also introduced new cultural and behavioral objectives: "Invest in energy management systems and personnel to provide leaders with building-level transparency of energy consumption to further drive efficiency beyond infrastructure related improvements at the command and functional levels" (p. 4). Transformation of the energy culture included the following: 1) analytics—to provide consumption data to leaders for behavioral modification; 2) procedural changes to effect consumption rates; and 3) conservation awareness and developing a sense of value for energy resources (p. 4). To achieve the DON objectives, the instruction required placement of energy managers at each shore installation. These new objectives—to identify policy goals, cultural and behavioral changes and to institute management billets—propelled the need for additional manpower within the DON and Marine Corps energy programs.

Strategy documents have begun to incorporate energy considerations. In the *Marine Corps Vision & Strategy 2025,* HQMC (2013b) highlights the need to integrate naval capabilities and develop less energy-intensive operations and equipment (p. 23). The strategy document also calls for improvement in energy conservation to further Marine Corps efforts in environmental conservation (p. 25). In the more recent *Expeditionary Force 21 (EF 21),* HQMC (2015f) introduces the 10-year vision of the Marine Corps. *EF 21* does not specifically speak to energy, but it mentions refining the organization and expeditionary logistics to reduce logistical vulnerabilities (p. 40). Strategy drives policy, which, in turn, is used to develop doctrine. This research did not find any Marine Corps operational energy policy or doctrine.

In his inaugural planning guidance, the 36th Commandant of the Marine Corps presented his commander's intent regarding energy use and conservation. General Joseph Dunford (2015) acknowledged that energy resources are now and will remain a source of global conflict and that all Marines have the responsibility of energy conservation and making smart resource allocation decisions. Prior to the acknowledgment by General Dunford, the 35th CMC General James Amos also addressed the need for change in his 2010 planning guidance.

> The future security environment requires a mindset geared toward increased energy efficiency and reduced consumption, thus allowing us to operate lighter and faster. We will aggressively continue our pioneering efforts in energy through our Expeditionary Energy Office, with goals of reduced energy demand in our platforms and systems, self-sufficiency in our battlefield sustainment, and a reduced expeditionary footprint on the battlefield (p. 9).

Building from the DOD, DON, and Marine Corps leadership, the Marine Corps institutionalized its energy programs by establishing energy management offices to oversee the creation of policy and doctrine. While still a work in progress, the Marine Corps has dedicated two higher headquarters commands to oversee further program development and reporting requirements.

HQMC (2011a, 2011b, 2012a) published three foundational documents to guide operational energy programs: *United States Marine Corps Expeditionary Energy Strategy and Implementation Plan: "Bases-to-Battlefields,"* the *Initial Capabilities Document (ICD) for USMC Expeditionary Energy, Water, and Waste (E2W2)* and the *2012 U.S. Marine Corps S&T Strategic Plan: Leading Edge Technology for the Marines of Tomorrow*. The strategy and

implementation plan directs the Marine Corps to "Lead, Man, Train, and Equip" the force in order to meet energy reduction and management goals (p. 31). While not specific in details, the implementation plan calls for an ethos campaign, increased leadership, formal training and education, and innovation in energy practices.

The *ICD* (HQMC, 2011b) provides a capabilities-based assessment approved by the Marine Corps Requirements Oversight Council (MROC). The ICD also identifies capability gaps in the management of USMC energy use for both installation and expeditionary operations across the warfighting functions, most notably within command and control (C2) and logistics functions (p. 10). Additionally, the *ICD* identifies further non-material solutions across the areas of policy and Doctrine, Organization, Training, Materiel, Leadership & Education, Personnel, and Facilities (DOTMLPF). The *ICD* provides recommended solutions to bridge manpower, personnel, and training/education gaps needed to meet objectives in the implementation plan. An example of this is a recommended doctrinal change to develop standard operating procedures to "employ utility planners at the MEB level and above" (p. 14). The *ICD* leverages current capabilities (existing personnel) to close the gap (lack of utility planners in the G-5). The *ICD* further recommends that the Marine Corps "conduct a detailed E2W2 organizational structure and manpower analysis to define necessary changes, and to schedule funding and implementation" (p. vi).

In the *S&T Strategic Plan,* HQMC (2012a) emphasizes expeditionary energy as a priority in 2012 and beyond, specifically in the field of logistics. A main logistical goal is to develop and procure technology that provides "for enhanced self-sufficiency for water, fuel and electrical energy are critical" (p. 26). Each of the Marine Corps' documents provides a foundation in establishing the importance of operational energy management.

2. Energy Reduction Plans

The primary objectives in the Marine Corps' energy initiatives involve reduced energy consumption and generation of renewable resources in order to eliminate its dependence on foreign energy power and to reduce the tactical costs associated with energy requirements. As such, HQMC (2011a) identifies the following organizational objectives:

- By 2015, Marine Corps equipment and systems will be monitored to enable commanders and program managers to track and manage energy and water demand levels and overall usage (p. 21). (Note: objective met in part by institution of Unit Energy Manager program in March 2015.)
- By 2020, 50 percent of bases and stations will be net-zero energy consumers (p. 23).
- By 2025, deploy forces that can maneuver from the sea and sustain Command, Control, Communications, Computers, and Intelligence (C4I) and life support systems in place; liquid fuel is only needed for efficient mobility systems (p. 17).

Notably, the Marine Corps separated its energy strategies into bases and battlefields. The organizational policy objectives for bases and battlefields, respectively, follow.

Bases and Installations

- Reduce Energy Intensity
- Reduce Water Consumption.
- Increase Alternative Energy
- Reduce Non-Tactical Petroleum Use

Battlefield (expeditionary operations)

- Increase Energy Efficiency of Weapons Systems, Platforms, Vehicles, and Equipment
- Meet Operational Demand With Renewable Energy (p. 23)

At the time of publication, the energy strategy and implementation plan incorporated both operational and installation objectives. The operational and installation goals and metrics envisioned at publication are shown in Table 1.

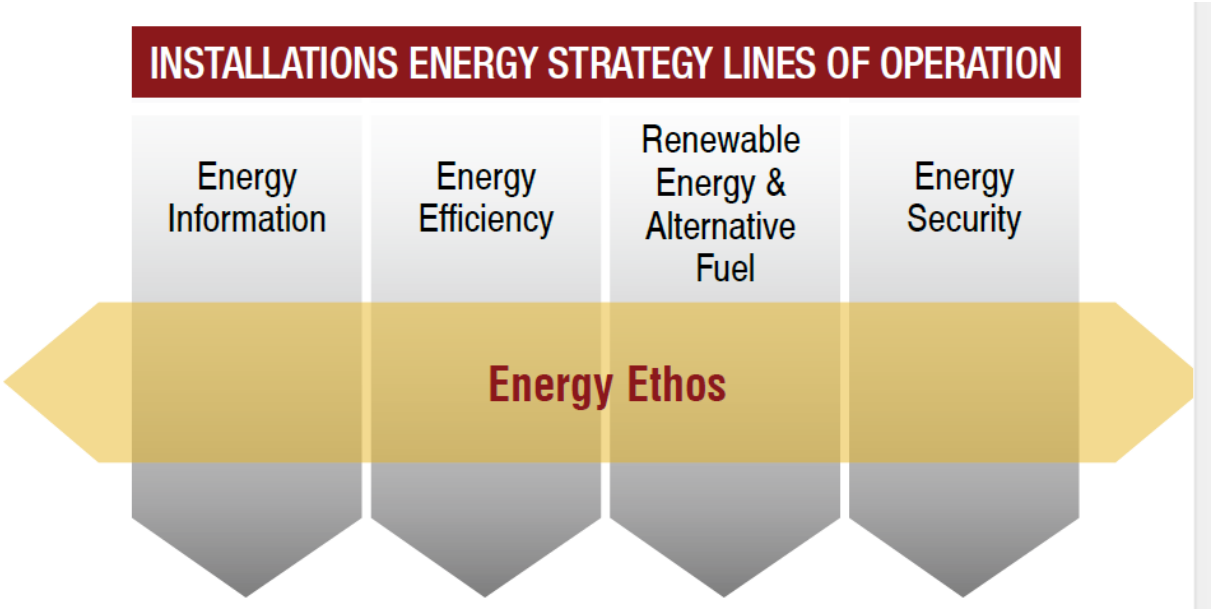
Table 1. Expeditionary Energy Goals

E^2 GOALS	Efficiency Gains		
	2015	2020	2025
Embed E^2 Into USMC Ethos	**25%**	**40%**	**50%**
Lead and Manage E^2			
Increase Energy Efficiency of Weapons Systems, Platforms, Vehicles, and Equipment			
Meet Operational Demand With Renewable Energy			
Reduce Energy Intensity (EISA 2007)	From 2003 to 2015, reduce energy intensity at installations by 30%		
Reduce Water Consumption Intensity (EO 13514)	Through 2020, reduce water consumption intensity by 2% annually		
Increase renewable Facility Energy (NDAA 2010, SECNAV)	By 2020, increase amount of alternative energy consumed at installations to 50%		
Decrease Petroleum Consumption (SECNAV)	By 2015, decrease non-tactical petroleum use by 50%		

Source: Headquarters Marine Corps. (2011a). *United States Marine Corps expeditionary energy strategy and implementation plan: "Bases-to-battlefields."* Washington, DC: Expeditionary Energy Office. (p. 22) Retrieved from http://www.hqmc.marines.mil/e2o/Resources.aspx

With policy objectives identified, the Marine Corps then developed an internal strategy to achieve its objectives. HQMC (2015b) published *United States Marine Corps Installations Energy Strategy*, which describes the five Lines of Operation and the Marine Corps' approach to its mission objectives. The installation energy strategy's five lines of operation include energy information, energy efficiency, renewable energy and alternative fuel, energy security, and energy ethos, as shown in Figure 2.

Figure 2. Five Lines of Operation



The five Lines of Operation "provide a comprehensive approach to achieving its mission, with ethos underscoring all other aspects" (p. 3). Source: Headquarters Marine Corps. (2015b). United States Marine Corps installations energy strategy. Washington, DC: Marine Corps Installations Command. Retrieved from http://www.mcicom.marines.mil/Portals/57/Docs/GF%20Energy/Energy%20Strategy.pdf

The handbook also identified three additional goals for the year 2020:

- Reduce energy intensity 37.5 percent versus 2003 baseline
- Produce at least 50 percent of energy requirements from alternative sources
- Reduce water intensity by 26 percent versus 2007 baseline (p. 3)

3. Cultural Change

The Marine Corps attempted to leverage its current assets—its people—to do the bulk of the work in reducing energy consumption. Leadership from the top down personally addressed the importance of individual behavior on the success of energy initiatives, promoting the credibility of the energy programs. The Marine Corps' most significant cultural shifts have been in prioritizing leadership efforts, advertising the energy ethos campaign, and changing individual and organizational behavior. The Marine Corps capitalized on its warrior ethos by brandishing the "energy ethos" campaign. The service attempted to do more with less by changing organizational culture and individual behavior. By incorporating a service wide cultural change,

the Marine Corps dispersed management responsibility across all ranks. This effectively reduced the burden for centralized management of energy programs.

a. Leadership

Commanders took charge by addressing the energy program individually. The president of the United States, Secretary of the Navy, and Commandant of the Marine Corps have all highlighted and announced the importance of global and military energy stewardship. The DON (2015g) Navy Energy Training and Education (T&E) Plan announced that

> Navy leaders must be trained to consider energy in all phases of operational planning and execution. Raising the level of energy literacy will influence senior stakeholders to foster new policies, programs, and efficiency best practices across the Navy in requirements generation, acquisition, and operations (p. 5).

When leaders give their full and consistent attention to an initiative, their subordinates tend to accept the change more readily. This section identifies specific messages that deliver the commander's intent for energy efficiencies.

In March 2015, President Barack Obama released an executive order, Planning for Federal Sustainability in the Next Decade. The order called on federal agencies to continue to lead in energy efficiencies and innovations. Obama (2015) said that "pursuing clean sources of energy will improve energy and water security, while ensuring that federal facilities will continue to meet mission requirements and lead by example." As the military's commander in chief, as well as the leader of the nation, the executive order ensured the government's leadership of the energy revolution.

In ALNAV 073/15 (DON, 2015f), the acting Secretary of the Navy released a message to all Marines and Sailors announcing that the DON theme of the year was "Power, Presence." This was in concert with the president's proclamation of October 2015 as Energy Action Month (Obama, 2015). The acting SECNAV continued to introduce the Great Green Fleet (GGF), an enterprise wide energy program on display in 2016. He additionally identified that "planned tours, engagements with partner nations, and media events are an opportunity to recognize your efforts and underscore the Navy and Marine Corps' continued leadership in the energy arena" (para. 7). This statement signaled that the GGF would serve as publicity for the DON as a global leader in energy efficiency. The SECNAV ended the message with "our Navy and Marine Corps

leaders are sending the message that Sailors and Marines need to know and understand how their energy decisions can impact operations…. Every Sailor and Marine should take these messages to heart" (para. 6). The message imbued that as global leaders, each and every member of the DON has a place in determining the success of energy conservation initiatives.

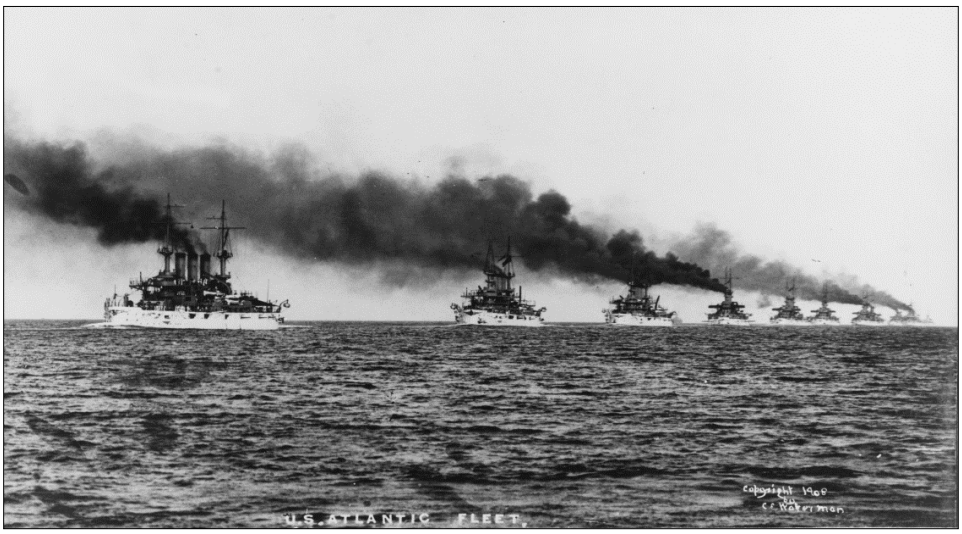
SECNAV Ray Mabus (2015) readdressed the DON and Marine Corps at the end of the October Energy Action Month to instill ownership in the program further. He reminded the force that the DON needs each individual to improve processes and push innovative ideas up the chain of command.

In a joint document (DON, 2015h), the Secretary of the Navy, the Chief of Naval Operations, and the Commandant of the Marine Corps signed the Department of the Navy (DON) Objectives for Fiscal Year 2016 (FY16). Of the four FY16 objectives, energy remained in the forefront. The "power" objective contains five sub-points:

- Increase alternative energy DON-wide
- Sail the Great Green Fleet
- Leverage 1 gigawatt execution to improve energy security
- Institutionalize resource and energy efficiency throughout the DON
- Develop an integrative energy security and resiliency strategy (p. 3)

The Navy sailed the Greet Green Fleet (GGF) in January 2016 to exhibit its achievements in renewable energy and advancements in bio-fuel technology. The Navy's energy, environment, and climate change website (2015d) reported that "Secretary Mabus chose the name Great Green Fleet to honor President Theodore Roosevelt's Great White Fleet, which helped usher in America as a global power on the world stage at the beginning of the 20th Century." The Great White Fleet, which sailed in 1907, was powered by steam with visible plumes emitting from the ships as they sailed from Hampton Roads, Virginia (see Figure 3). Provided in Figure 4 is a contrasting photograph of the GGF running on biofuel, without the plumes of smoke. Secretary of the Navy Ray Mabus is pictured delivering a speech in front of the USS *Stockdale* before the departure of the Great Green Fleet, fueled entirely by renewable energy and American manufactured bio-fuel (see Figure 5).

Figure 3. Great White Fleet



Photographed by C.E. Waterman, Hampton, Va. USS *Kansas* is at left, followed by USS *Vermont*. Collection of Roy D. France. U.S. Naval History and Heritage Command Photograph. Source: http://www.history.navy.mil/our-collections/photography/us-navy-ships/battleships/kansas-bb-21/NH-92091.html

Figure 4. Great Green Fleet

As part of the Great Green Fleet, Carrier *John C. Stennis* (second from left), and its escorts deployed in January 2016 running off a mix of fossil fuel, biofuel, and nuclear energy. (Photo: MC2 Ryan J. Batchelder/Navy). Source: http://www.navytimes.com/story/military/2015/12/14/great-green-fleet-readies-sail-january/76994698/

Figure 5. Great Green Fleet Kick-off Event

U.S. Navy photo by Mass Communication Specialist 3rd Class Christopher Veloicaza. Source: https://www.dvidshub.net/image/2363273/secnav-promotes-great-green-fleet#.VqE38qPSlYc

Navy and Marine Corps leaders recognize the impact of the military's reliance on energy and the susceptibility to risk inherent in its energy needs. Leadership has called all Sailors and Marines to take stock of their personal responsibilities and influence change where practical and where innovation allows.

b. Ethos and Cultural Shifts

HQMC (2011b) acknowledges that an energy efficiency program would rely on

> establishing a permanent ethos throughout the Marine Corps that considers energy and water to be constrained resources and key combat enablers with operational "costs." As a result; awareness, education, and training form a center of gravity to this capability set (p. 5).

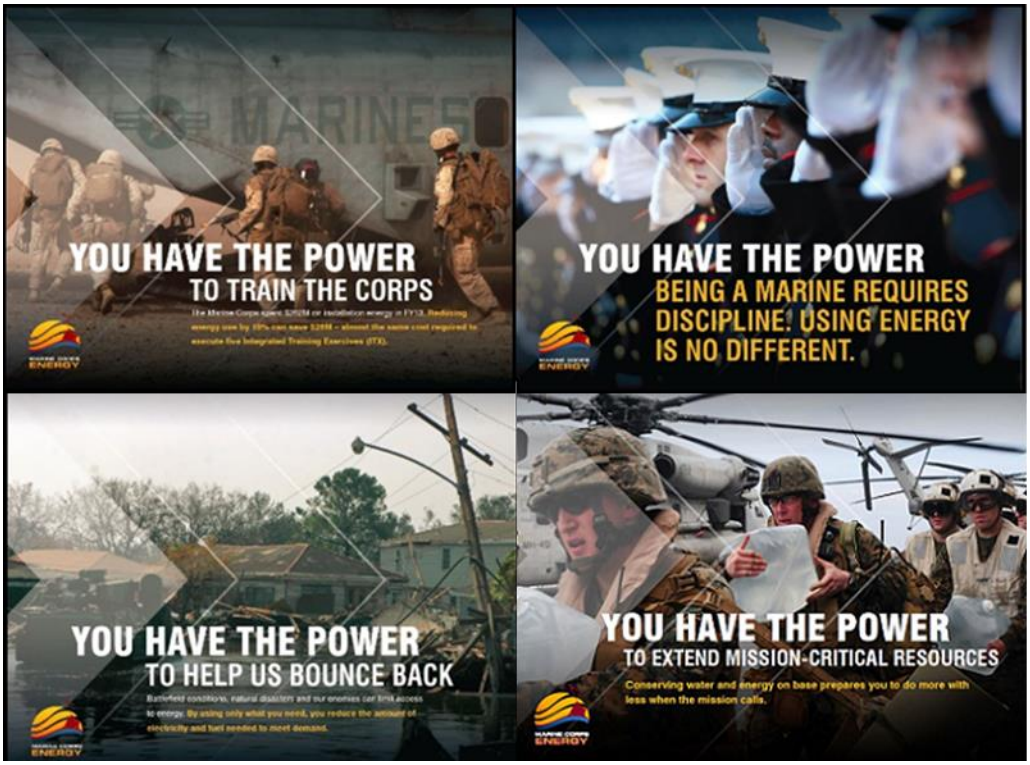
In order for the clients of change, in this case the individual Marine, to effect large-scale transformation, the organizational culture must shift from that of thoughtless waste to thoughtful economy and stewardship of scarce resources. The DON (2015g) contends that "energy T&E, much like safety training, must be effectively disseminated to officers and enlisted in such a way that it positively informs, affects behavior, and changes culture throughout the Navy" (p. 5). To generate such a shift in culture, the Marine Corps adopted an energy ethos campaign.

General William Faulkner (2014), deputy commandant for Installations and Logistics Command, introduced the Marine Corps energy ethos campaign in 2014. Leaders aimed to provoke a response by challenging their Marines who "are known for being frugal" to act as "champions to promote smart energy behaviors." Likewise, MARADMIN 114/15 (HQMC, 2015a) noted that "the Marines Corps' takes pride in being disciplined and in providing the best value to the nation. This must extend to energy conservation. Energy ethos will shape a Marine Corps to meet the challenges of the future" (para. 5). This tactic for cultural change is aimed at targeting the Marine's pride and sense of responsibility to the nation. It uses the Marine Corps' warrior ethos to extend to the energy campaign.

In MARADMIN 180/14, HQMC (2014) announced the Marine Corps' celebration of Earth Day 2014. The message highlights several themes that resonate with the verbiage used in recruiting or warrior ethos training. The common themes include "protecting," acting as "good stewards," using "resources entrusted to us," "making a difference," "stewardship," and commitment. The line, "we are the world's premier fighting force, let's strive to be the world's premier environmentalists" capitalizes on Marine Corps values and tradition of pride (para. 3). The message speaks to global responsibility and safeguarding resources in order to remain mission ready for contingencies across the globe.

The energy ethos campaign elicits the Marine Corps warrior ethos with phrases and images used in the "You Have the Power" poster series. The posters suggest that each Marine has the power to make a difference and influence the Corps, country, and world through individual actions. You Have the Power campaign posters target individual shifts in thinking and behavior, complementing the ethos campaign. The posters target individual daily repetitive behaviors expected to result in long-term behavioral change within the military. The e-ROI of the behavioral campaign includes investment in non-material solutions such as cognitive and behavioral sciences to reap longer term returns. Such an approach theoretically translates into fewer energy manager manpower requirements at the unit level. A grouping of the poster series is illustrated in Figure 6.

Figure 6. "You Have the Power" poster series



Photos selected from the "You Have the Power" poster series. Property of Marine Corps Instalations Command, Marine Corps Energy photos. Retreived from: http://www.mcicom.marines.mil/Units/GFFacilities/GF1Energy/GF1MarineCorpsEnergyPhotos.aspx

The energy ethos campaign and "You Have the Power" poster series have a strategic focus. Generating grass roots interest and cultural beliefs allows the Marine Corps to harness the energies and ideas of its people to foster change. This allows the Marine Corps to "train" and educate its force through corporate citizenship—affecting larger scale change than a few appointed leaders could do alone.

c. Individual and Organizational Behavior

In addition to the ethos campaign and culture shift, the Marine Corps targets individual behavioral change through contracted service providers in the fields of behavioral science and organizational management. Mooney (2015) covers the Marine Corps' energy programs in a *Washington Post* article. He notes that E2O "is tapping into one of the hottest trends in academic energy research: looking to use psychology and the behavioral sciences to find ways of saving energy by changing people—their habits, routines, practices and preconceptions." The article

also notes that DON has collaborated with behavioral science experts at Columbia University and the Woodrow Wilson Center to identify behavioral changes that could result in long-term cost savings. An example of such behavioral change is reduction of vehicle idling time. The article tells the story of Marines idling in new fuel savings vehicles, because in the past if a driver were to shut off the engine of an older legacy vehicle, the engine might not turn back on—so drivers learned to idle their vehicles in order to avoid any mechanical failure. By targeting wasteful behaviors ingrained in the institution, experts hope to replace them with more energy efficient actions. The E2O office also partnered with Naval Sea Systems Command (NAVSEA) Warfare Centers Carderock on the Behavioral Energy Operations Demonstration (BEyOnD) (DON, 2015e). A BEyOnD objective is to leverage behavior modification techniques to reduce USMC fuel consumption in deployed or logistically challenging areas (slide 4). Behavioral and organizational theories suggest that change requires the Marines understand the urgency and be aware of their individual actions within the organization (McShane & Von Glinow, 2009).

As energy costs increased in the global market, the Marine Corps began to identify personal costs savings techniques associated with gasoline and utilities consumption. By identifying cost savings behaviors, Marines learned how to reduce consumption and see immediate returns in their cash flow. Changing the behavior of a Marine driving a privately owned vehicle easily translates to both non-tactical and tactical vehicle use aboard the installation and elsewhere. By promoting cost saving behaviors at home and in their personal time, it was expected to result in a transfer of similar behavior to the organization. MCICOM distributed an Energy Action Month flier with tips to save fuel when driving, as shown in Figure 7.

Figure 7. Energy Action Month Flier

Marine Corps Installations Command Energy Action Month flier. Retrieved from: http://www.mcicom.marines.mil/Portals/57/Docs/GF%20Energy/Energy-Action-Month/2015-EAM-5-Ways-to-Save.pdf

4. Awards and Recognition Programs

The DON and Marine Corps have developed several awards and recognition programs to acknowledge the work of individual Marines or units achieving energy objectives or establishing outstanding unit energy programs. The awards program creates a culture of competition between units in meeting energy objectives. The following references are provided:

- SECNAVINST 4101.2 - SECNAV Energy and Water Awards Program (see also MARADMIN 312/15). Includes both installation and operational commands. This is a battalion or squadron level award for implementation of energy efficient equipment and practices. Includes reduction of energy consumption without degradation of mission or extension of mission with reduced consumption, lessening the load for supply and resupply, efficient use of training personnel in energy management, and innovations in energy related processes.
- NAVSUPINST 3590.1E - Excellence in Naval Fuel Management Recognition Program (see also MARADMIN 153/15). This award recognizes outstanding achievements in bulk fuel operations and petroleum supply management. The program recognizes units and individual Marines with an award.

- Commander in Chief's Annual Award for Installation Excellence—DOD recognition of outstanding and innovative efforts of the operators and maintainers of DOD installations.
- American Petroleum Institute (API) Command Awards and Fuels Personnel of the Year Awards—Recognition of outstanding performance in the professional field of bulk fuels.

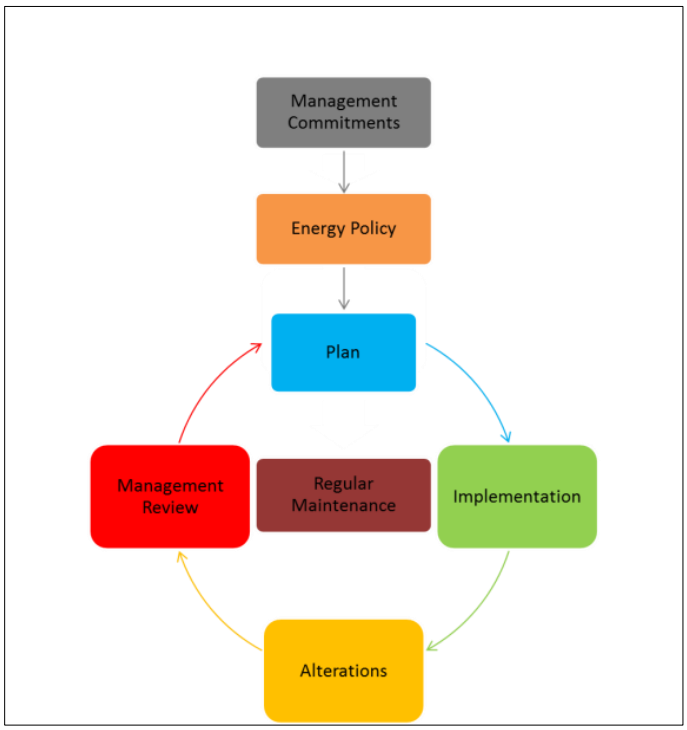
5. Management Theory and Practice

In order to staff a program an organization must understand its needs and objectives. Only then can the organization hire the right people with the necessary knowledge, skills, and abilities (KSAs) to meet the performance objectives. This section reviews available literature regarding energy management theories in corporate business and government. The section also examines policies and management systems in place for the Marine Corps.

a. International, Corporate and DOD Management Theory

In a review of business organizations, Wang and Chen (2012) advocate for establishing an energy management system per the International Organization for Standardization's (ISO) energy management standards. The ISO theory of energy management is based on a "plan, do, check, action" model. The business organization must identify its needs and establish objectives (plan). The organization managers then execute the plan (do) and maintain all newly established systems (check). In a continuous feedback loop, the managers assess target metrics and improve the energy management system (action). The energy management model is illustrated in Figure 8.

Figure 8. Energy Management Model



Adapted from Wang, F. & Chen, A. (2012). *Energy management handbook.* Retrieved from http://www.bsr.org/reports/bsr-energy-management-handbook.pdf

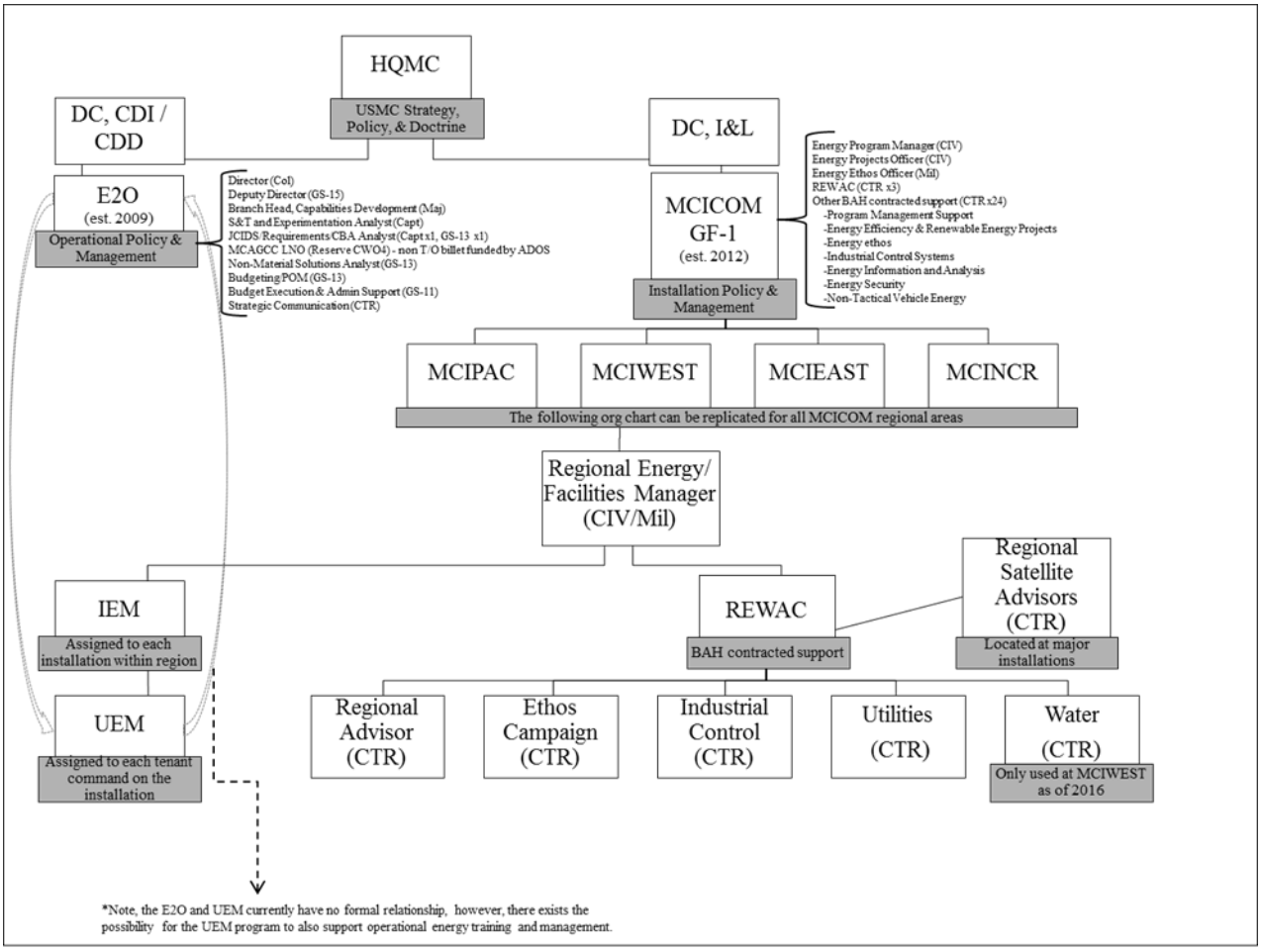
The Marine Corps adopted a similar model with the creation of Installation and Logistics Command (I&L) energy management teams. The I&L and MCICOM GF-1 energy offices established management practices and developed installation energy strategy and policies. An example of the "plan, do, check, action" model can be loosely applied to the Unit Energy Manager (UEM) program implemented in 2015. The planners developed position requirements and responsibilities of the UEM. Commanders began appointing the tenant level UEM as directed in March of 2015. Via monthly and quarterly checklists the Installation Energy Manager and GF-1 teams adjusted reporting requirements to better meet the requirements of installation energy management. Appendix C provides UEM materials developed to assist installation UEMs in their duties. Feedback from persons assigned as a UEM proved invaluable in identifying program weaknesses. McCombs (2015) provided the E2O with an after action report of UEM training and design flaws within the UEM entry and exit survey created to gauge a Marine's understanding of energy. Feedback from operational units allows the E2O and GF-1 offices the

opportunity to take remedial action within the UEM program. Development of proper feedback loops allows the Marine Corps to improve overall system performance.

b. DOD & Marine Corps Current Energy Management Practices and Guidance

The Marine Corps established the Expeditionary Energy Office (E2O) in 2009 to oversee the optimization and management of energy practices across the organization. Located at Headquarters Marine Corps, the E2O was in an ideal position to advocate for energy change across the organizations planning departments. Likewise, in order to streamline installation resources and procedures, Marine Corps Installations Command (MCICOM) within Installations and Logistics Command became fully operationally capable in 2012. Ayala (2014) notes MCICOM's mission was to act as a single authority for all Marine Corps installation matters to increase efficiency and effectiveness in supporting requirements and capabilities of the warfighting mission. Energy is a specific installation function and a key priority for MCICOM. Ayala (2014) suggests that by prioritizing energy investments and savings within its spectrum of services, the installation could fund other services critical to support expeditionary forces and tenant commands. The Marine Corps has developed a robust installation energy management program with centralized management and leadership held at I&L and MCICOM GF-1. The E2O, however, has not built a robust energy management core. The USMC energy management organizational structure is illustrated in Figure 9 and Appendix A.

Figure 9. USMC Energy Management Organizational Structure



Adapted from personal communications with E2O, I&L, and MCICOM subject matter experts (SME). Sources: E2O (M. Prato, personal communication, February 11, 2016), MCICOM GF-1 (S. Houldsworth, personal communication, February 4, 2016), and MCIWEST GF-1 (M. Daily, personal communication, January 21, 2016).

The following sections provide energy management guidance used at either the installation or operational level of command.

(1) DOD Installation Guidance

DoDI 4170.11 (DOD, 2009) provides guidance for the Installation Energy Manager program, complete with roles and responsibilities. The instruction requires military organizations to appoint an Installation Energy Manager (IEM) at the major installations. The IEM is responsible for the establishment and execution of an energy management program that includes, but is not limited to the following:

- Provide funds sufficient to meet energy and water conservation goals.
- Implement policies/ procedures to measure progress in meeting conservation goals.
- Report energy and water use.
- Develop programs to achieve optimum performance and maximize energy efficiency.
- Provide facilities with trained energy program managers, operators, and maintenance personnel. Conduct training programs to ensure energy efficient operation of sustainable facilities.
- Develop internal energy awareness programs and promote energy efficiency awards and recognition (p. 7).

The DOD (2005) *Energy Manager Handbook* provides further instructions pertaining to Installation Energy Management. Part II of the handbook describes "Starting an Energy Management Program" with specific guidance for development of installation energy managers (IEM), installation energy management teams, and coordination between adjacent energy consumers and functional area managers.

(2) MCO P11000.9C with Change 4 – Real Property Facilities Manual, Volume VI (1991)

The order identifies itself as the primary source of information for Marine Corps utility management and energy conservation at the installation level. It specifically provides guidance for the Facilities Maintenance Division, Utilities Branch, and Public Works department. The order further identifies the DOD requirement for energy management reporting via the Defense Utility Energy Reporting System (DUERS) (HQMC, 1991, p. K-1; L-1 to L-3). DUERS is a monthly report of installation energy use and cost by type of fuel and square footage. This data is included in the Energy Audit Report (EAR), and reported to the Office of the Secretary of Defense for DOD compilation and further submission to the Department of Energy and Congress. The DUERS report covers a 30-day utility billing cycle and is due on the last day of the month following the meter reading.

(3) Experimental Forward Operating Base (ExFOB) Charter (2012)

The charter (HQMC, 2012b) establishes a semi-annual field demonstration coordinated by E2O. The event is intended to "identify, evaluate, and accelerate material solutions to fulfill identified capability gaps and increase energy efficiency" as established in the *Initial Capabilities Document for United States Marine Corps Expeditionary Energy, Water, and Waste* (HQMC, 2011b, p. 2). The event invites civilian industry partners to display innovative, energy-saving technology capable of tactical use. Per its website, the USMC expects the ExFOB to increase or gain capability in the following areas:

- Power patrol bases entirely on renewable energy.
- Conduct extended foot patrols with limited or no fuel or battery resupply.
- Lighten the carried load of batteries and water for a 96-hour patrol from ~65 lb to ~7 lb.
- Reduce the need to carry multiple types of batteries.
- Reduce generator runtime by up to 80 percent and generator fuel use by up to 50 percent.
- Increase fuel efficiency of the Medium Tactical Vehicle Replacement (MTVR) by 25 percent or more.
- Reduce vehicle fuel use while idling by 30 percent (United States Marine Corps Concepts and Programs, 2014).

Daniel (2015) refers to the ExFOB as Expeditionary Energy Concepts (E2C). Expect to find E2C used in future policy and guidance.

(4) MCO 3900.19 – Applying Energy Performance Metrics and Measures in Requirements Development and Acquisition Decision-Making (2013)

The order identifies energy as "the only combat enabler that crosses all elements of the MAGTF" and as such, the acquisitions field is in a unique position to ensure all "energy performance considerations" are included at the earliest stages of the acquisitions process (HQMC, 2013a, p. 2). The order further identifies the responsibilities of acquisition planners, operators, advocates, and program managers in ensuring energy efficiencies are considered along three lines of operations:

- Procuring equipment that is more energy efficient and including energy efficiency in upgrades to legacy equipment.
- Increasing development of renewable energy systems that harvest energy in place.
- Establishing an expeditionary ethos that equates increased combat effectiveness with efficient resource employment (p. 2).

The order also specifically identifies eight roles of the E2O Director, the first of which is provided as follows:

> As the Marine Corps SME for operational energy work closely with the requirements, acquisition, and technology development communities to construct EP [energy program] considerations into all MAGTF materiel and non-materiel solutions (p. 7–8).

(5) Commander's Energy Readiness Program (CERP) (2014)

The Expeditionary Energy Office (2014) identifies the Commander's Energy Readiness Program (CERP) as one that provides commanders with real time fuel and power data with which to make operational decisions. The intent is to institutionalize the accountability of fuel similar to that of accountability for ammunition. Daniels (2015) identifies two additional approaches that complement the CERP: the Expeditionary Energy Readiness Program (EERP) and Energy Command and Control (Energy C2).

(6) MARADMIN 114/15 (2015)

In March 2015, HQMC (2015a) directed each installation tenant command to assign a Unit Energy Manager (UEM). MCICOM produced two handbooks to guide and supplement the IEM and UEM in the conduct of their duties:

- Unit Energy Manager Program: Handbook for Installation Energy Managers (HQMC, 2015c) - provides guidance to the IEM for management of the UEM program, training guidance, and additional resources and references.
- Unit Energy Manager Program: Handbook for Unit Energy Managers (HQMC, 2015d) – provides guidance, training requirements, responsibilities, and additional resources and references.

c. Organizations with Management Responsibility—Bases and Battlefields

Marine Corps installations are the bases in "bases-to-battlefields." The installation is government property commanded by Marine Corps commander and under the responsibility of MCICOM. The installation commander has direct authority over tenant commands in regard to plant and property equipment. The installation commander is responsible for the facilities, land, and energy upon which the tenant command relies. The installation commander is also responsible for all military berthing, family housing units, and other non-housing type facilities (work spaces, common areas, ranges, roads, etc.). The installation commander maintains the base utilities that provide power to all tenant organizations. Also included are equipment used to maintain or operate the installation: non-tactical vehicle fleet, renewable energy equipment, and generators. The Installation Energy Manager (IEM) is appointed to manage all energy requirements at the installation. See Appendix B for an installation energy responsibilities matrix.

Non-base units represent the battlefields in "bases-to-battlefields." Non-base units are typically deployable or in support of deployable units and as such are considered "tenant" commands on an installation. Tenant commands utilize the facilities and permanent infrastructure on the installation. Each tenant command consumes installation provided energy for building use, but is responsible for their operational energy requirements. Operational energy includes tactical vehicle fuel, generator fuel, batteries, and other consumables used in training or operating tactical equipment. Energy management at the expeditionary level (in garrison or deployed) typically includes the MOSs of logistics, bulk fuels, engineering, and utilities. Major consumers of energy also include the fields of motor transportation (petroleum for tactical vehicles) and communications (petroleum for generators and batteries). Every organization includes managers and consumers of energy; however, logistic support units often maintain the bulk of these specialties by virtue of the capabilities provided. All expeditionary units likewise consume energy in the form of electricity to operate computers in the workspace and utilities in the work and living spaces. A major consideration for logistics planners when supporting an expeditionary force's energy requirement includes consumption of batteries and petroleum used to fuel generators and operate tactical vehicles.

6. Training and Education

In the energy strategy and implementation plan, HQMC (2011a) identifies the "Lead, Man, Train, Equip" approach. The training objective follows.

> Train and Educate Our Marines in Expeditionary Energy. We will establish and reinforce the relationship between energy and combat effectiveness through formal training and education. We must analyze the current skill sets and establish future capabilities for the MAGTF to optimize combat-effective, energy-efficient operations. We will use basic and formal schools to train and educate our Marines on the importance and relationship of energy to operational planning and execution (p. 33).

The objective seeks to update all doctrinal references with relevant energy material at the time of reissuance. The same goes for all formal training materials coordinated through Training and Education Command (TECOM). In the DON (2015g) Energy Training and Education Plan, a working group identified current Naval training opportunities and the gaps to be addressed by 2017. The document identifies types of training to be delivered to different ranks and to different warfare specialties.

a. HQMC Funded or Approved Courses

Schaffer (2012) identifies that TECOM implemented the ethos campaign into the professional military education curriculums of Expeditionary Warfare School (EWS) and the Sergeants Course. According to Schaffer, accession pipeline schools such as The Basic School and Marine Combat Training have also incorporated learning objectives to cover expeditionary energy awareness. The next logical step would be to update all MOS training curricula in order to teach energy awareness applicable to MOS specific duties and responsibilities. See Appendix D for a list of MOS schools or supplemental training available to the relevant existing MOSs that could benefit from an energy package in their curriculum.

b. Naval Postgraduate School

The Naval Postgraduate School currently offers four degree programs with an energy focus as well as an Energy Certification course and an executive leadership course. The Navy assigns graduates of these programs a sub-specialty code for assignment to follow-on utilization tours (Devorak, 2013). The Marine Corps does not have a corresponding MOS designator to

identify the specific educational skill requirements (ESR) gained by completing the energy curricula.

c. Civilian Accreditation

The civilian energy sector continues to grow as the requirement for skilled energy managers is identified. Associations and certification programs are now available to provide credit to the professional energy manager or energy engineer. The Association of Energy Engineers (2015) offers accreditation for Certified Energy Manager (CEM) or Energy Manager in Training (EMIT) and manages an Energy Management Society (EMS) division. The Energy Management Association (EMA) (2015) likewise certifies Energy Management Professionals (EMP) and has published an Energy Management Guideline. The EMA describes itself as "a new and innovative association that is dedicated to advancing the quality of energy management products and services for the benefit of the building owner." The requirements for energy management are not codified as of yet, however most positions require at least a bachelor's degree in engineering from an accredited institution. To obtain the most qualified candidates, the Marine Corps should require certifications in the position descriptions when soliciting new hires to fill civilian energy management positions. See Appendix I for a sample civilian position description for an energy management billet.

According to Environmental Science (2015) the average annual salary of an accredited energy engineer (under 17–2199 Engineers, all other) in 2013 was $92,680, as reported by the U.S. Bureau of Labor and Statistics (BLS). BLS projects job growth at 3–7%, adding approximately 29,500 jobs to the economy between 2012 and 2022 (BLS, 2013).

C. LITERATURE REVIEW

The literature review covers energy related manpower force structure within the Navy and Marine Corps. The literature review also discusses MOS training, organizational change, and approaches to energy management.

1. Navy and Marine Corps Classifications

In a qualitative study on the Navy's use of energy related graduate degrees from the Naval Postgraduate School (NPS) and an officer's follow on utilization tour, Devorak (2013)

found that a majority of sub-specialty codes assigned to officers for their follow-on utilization tours were not specifically energy related. Devorak recommended creating new sub-specialty codes within the officer classification system: energy manager afloat and energy manager ashore. The two new designators with the energy related skills gained at NPS would be tied to specific energy billets on ship and shore. A limitation to Devorak's research is the lack of a task analysis of requirements at each billet location. The thesis did not tie the NOBC to fleet billets, nor did it identify the number of personnel or ranks needed at each of the units requiring the skills.

Devorak did note that prior to 2011, naval energy management fell primarily to the supply corps and petroleum management officers in their management and procurement of fuel products (p. 5). His observations were similar to that witnessed in the Marine Corps. Bulk fuels officers or operational and installation utilities managers typically maintain and plan energy requirements. As the Marine Corps looks to expand its energy management responsibilities, additional personnel must be trained and/or identified for management positions. The Marine Corps currently does not assign an additional MOS (AMOS) or a free MOS to those attending one of the four degree programs with an energy focus.

Castillo (2015) assessed the manpower force structure requirements for a cyber security technician. While not related to energy management, he looked at MOS training, duties per T&R manual, and formal and informal training required for an emerging Marine Corps capability. He analyzed the career progression of the MOS at the unit level and reviewed force structure information (MOS with relevance) and related career paths. This analysis would be useful when an MOS is designated for the energy program.

2. Behavioral and Cultural Change

McShane and Von Glinow (2009) suggest that through organizational socialization, modifying the behaviors of people can dramatically affect the outcomes of any policy or program changes. By incorporating reliable and consistent change agents to communicate new energy policy, the Marine Corps can reduce the number of people required to centrally manage the program (McShane & Von Glinow, 2009). Fewer people needed in management roles translates into fewer costs. The more acceptable the culture change, the less micromanagement required of program leaders. Schaffer (2012) reviewed the Marine Corps' energy ethos campaign through

John Kotter's organizational behavior approach to successful change. Schaffer systematically reviewed the ethos campaign at each of Kotter's eight stages to change. Schaffer concluded that the Marine Corps had succeeded in achieving six of the eight steps as of 2012, needing to still "consolidate gains and produce more change" and "anchor new approaches in the culture" (p. 20). In closing, Schaffer advocates that "positive transition will depend on the persistency" in achieving the final stages (p. 22). It could be argued that as of 2016, the Marine Corps ethos campaign continues to engage the final two steps in a continuous feedback loop as it develops new tactics in delivering the campaign message.

Similarly, the Army is using its military academy at West Point to develop what it calls "Greener Initiatives." Smith (2015) presented to an Energy Education and Training Working Group. The presentation delivered the Army's Greening Initiatives through three prongs: cadet education, leadership development, and reduction of energy costs and consumption. Smith announced the creation of an Energy and Environment brigade command structure led by cadets to act as environmental stewards in the areas of energy, water, and solid waste management. The Army's intent is to infuse all cadets with energy informed courses with approximately 1,200 officers graduating per year. The three pronged approach targets academics, garrison, and field training.

- Academics: through interdisciplinary courses to make "every cadet an energy manager"
- Garrison: through awareness/education, recycling, reduction, and competitions. A "green living guide" is used, similar to the USMC's energy action tips and ethos campaign
- Field Training: through a new Squad Power Manager (SPM) training at Camp Buckner starting in 2015.

Soldiers in the SPM are expected to test new operational energy technology. The Marine Corps also tests new operational energy technology at Twentynine Palms, CA, but no specific management training or MOS is assigned.

Each of the military services aim to change the behaviors and values of the organization in order to promote change. The DOD's (2012) *Operational Energy Strategy* document includes a summary of each service's energy vision. The Navy "values energy as a strategic resource"

while the Air Force contends "energy must be recognized as the base ingredient" for all missions (p. 12). For a full summary of each service's vision, see Appendix J.

The European Environment Agency (EEA) (2013) looks at behavior change and energy efficiency measures in public housing. The study identifies the following as necessary for change: feedback on consumption behaviors through metering, billing, auditing, and development of community-based initiatives. The Marine Corps is working to update all installation infrastructures to include smart metering in order to identify tenant organization consumption, therefore providing a metric to the commanders to change their unit behavior. Until metering and feedback is accomplished within the USMC, consumption rates may not reach their optimal low point. The EEA suggests that because direct feedback is "the most promising single intervention type," it must be continuous and provide real time reliable results to maintain effectiveness (p. 17).

3. Work Force Management

Billet assignment within the Marine Corps is a complicated process. Mottola (2010) looked at the troop-to-task analysis process for the Total Force Structure Division and provided a through summary of the Total Force Structure Process (TFSP). Mottola found that the template that existed at the time provided a subjective analysis that would benefit from a standardized set of business rules (p. v). In the study, Mottola concluded that one of the outputs of the process was that a "price tag can be placed on the human resource cost, by modeling authorized end-strength against the new structure requirement" (p. 46). The study demonstrated that identification of a needed billet encompasses a wide net of validation, the last of which is affordability. Once Marine Corps doctrine is updated to include energy management, the Marine Corps can use this process to cost the manpower requirement.

Goldman et al. (2010) conducted a review of the energy efficiency services sector for the Department Of Energy, Office of Energy Efficiency and Renewable Energy. The report highlighted the need for trained personnel "to design, implement, manage, and evaluate energy efficiency programs and to design, construct, install and maintain efficient building systems" and warned that bottlenecks would occur "if the work force is unable to expand at the same pace as the increased demand for energy efficiency services" (p. 1). The U.S. government established

new national requirements for energy management, yet the force structure process has not caught up with the Marine Corps' expected demands. The report further identified that "finding managers with energy efficiency experience is a significant issue" and "engineers with the appropriate skills are difficult to find" (p. 10). Leveraging the military academies and graduate level educational institutions may be a significant source of supply for military energy managers. Otherwise, demand in the civilian market is high and costs to hire a general schedule (GS) civilian or contractor with the desired skills may be prohibitive, if even allowable within the authorized civilian billets.

In order to hire civilian energy managers at a competitive rate, the starting position for a GS would be on par with a GS-13, Step 9 or above, to match the BLS reported average annual salary of $92,680 (OPM, 2015). Contracted positions hired to fill the expected bottlenecks may incur significant overhead fees and start at a higher premium due to the short term, highly coveted skill sets required. The Marine Corps must identify and weigh the "price tag" as Mottola suggested of military, civilian, and contracted positions as it moves forward into the field of energy management.

D. CHAPTER SUMMARY

This chapter introduced the Navy and Marine Corps policies and directives as they relate to energy management. The Marine Corps developed a framework to approach energy management by publishing several guiding documents, creating organizations to oversee the programs directions, and implementing a robust ethos campaign. Assignment of installation and unit energy managers has occurred at the organizational level. There exist two very different streams of thought in the Marine Corps energy management objectives: bases and battlefields. The bases have created a structure to begin the process of energy management. The battlefield organizations have not.

III. DATA AND PRELIMINARY ANALYSIS

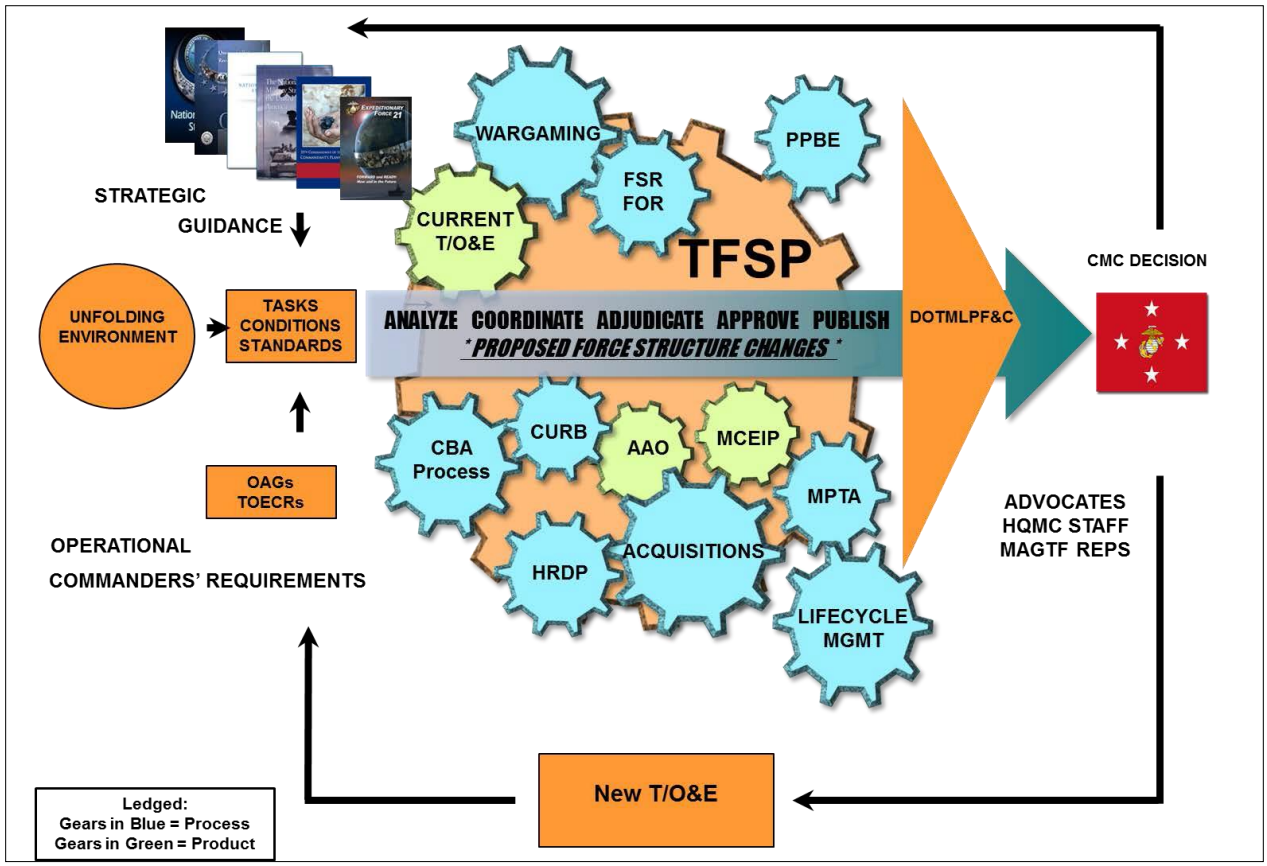
Chapter III reviews the manpower force structure currently supporting Marine Corps energy programs. The chapter reviews the Marine Corps' Total Force Structure Process (TFSP) and continues with an examination of energy related manpower billets on the Tables of Organization (T/O), both military and civilian, and reviews the civilian occupational categories of the energy management billets assigned. The chapter further examines the E2O and MCICOM organizational structure and current billet designations. The chapter also examines the signaling of importance, as shown by distribution of UEM's across installations. Training and educational opportunities are also presented for analysis.

A. MARINE CORPS TOTAL FORCE STRUCTURE PROCESS

The Marine Corps uses the Total Force Structure Process (TFSP) and Human Resource Development Process (HRDP) to achieve force structure objectives. The processes are complex and span multiple organizations and process stakeholders. Several NPS theses have analyzed the intricacies of distinct areas within the process. Fecteau (2002) reviews the assignment process, Mottola (2010) the troop-to-task analysis process, Hopper and Ostrin (2012) the optimization of assignment, and Castillo (2015) specific career paths within the force structure. Castillo (2015) summarizes the HRDP process and its components throughout his analysis, highlighting the concepts-based requirements process, tables of organization and equipment, manning controls, staffing goal model and the grade adjusted recapitulation report.

The Total Force Structure Process is an intricate multi-layered process with inputs from several stakeholders. A view of the systems processes in and surrounding the TFSP are captured in Figure 10.

Figure 10. Total Force Structure Process



Source: Headquarters Marine Corps. (2015). Total force structure process (Marine Corps Order 5311.1E). Washington, DC: Author. (p. 1–2, Figure 1–2).

HQMC (2015e) established the Deputy Commandant for Combat Development and Integration (DC CD&I) as the owner of the Total Force Structure Process. Changes to the force structure are initiated by new demands from strategic guidance (top-down) and operational requirements (bottom-up). The TFSP considers new or evolving requirements to force structure, partly informed by the HRDP process. TFSP includes the process by which new billet requirements are validated and translated into force structure solutions.

Top-down guidance typically takes place in the form of strategy, which in turn forms policy, which is then used to develop doctrine and mission essential tasks (METs). Upon review of mission essential tasks that drive the Training and Readiness (T&R) events (https://mctims.usmc.mil/TNRManual/TaskMaster/Pages/Home.aspx.), only a single installation level task existed in regard to energy management: "4.9.1 Provide Utility System Operations."

There was no specific mention of expeditionary or operational energy management to drive an operating unit or individual T&R event. The TFSP requires a mission-function-task analysis to evaluate each mission essential task (MET). "The unit is charged with executing by using SMEs to determine the right skills, by grade and quantity, and the right items of equipment by TAMCN and quantity, needed to accomplish the mission" (pp.3-4). Without an associated MET, the manpower force structure for operational energy management does not exist.

To analyze the manpower precedents and expected manpower requirements for energy management, the research must consider the MOS manual and associated Training and Readiness (T&R) standards that support assignment of billets. The following section identifies MOS requirements, existing MOSs relevant to energy management, and T&R events associated with those MOSs.

1. Marine Corps MOS Manual - NAVMC 1200.1A with Change 1

The Marine Corps MOS manual (DON, 2015a) lists the requirements for inclusion or exclusion of MOSs. The order provides detailed steps necessary to recommend any changes to the current MOS structure. The order goes further to describe in detail the MOSs currently available on the T/O. The following are the minimum requirements to recommend a new MOS:

- Identity of the Occupational Field (OccFld)/MOS involved in the change
- Detailed discussion of the problem or deficiency
- Recommended solution (p. vii)

a. MOS Manual Definitions and Business Rules

Marine Corps MOSs differentiate skill sets and training requirements for billets on the tables of organization. There are varying categories of MOS that a Marine may be assigned based on the skills obtained through training. Particular billets on the tables of organization require acquisition of skills to perform duties, which require the Marine obtain a new or additional MOS. An example of an additional MOS is the free MOS of 8056, Hazardous Material/Waste Officer, often assigned to billets with a primary MOS of logistics (04XX). For a complete list of definitions and business rules from NAVMC 1200.1A, see Appendix E.

- 80XX: Miscellaneous Requirement MOSs - These MOSs are MOSs that do not fit into a regular OccFlds but are used on the Marine Corps Tables of Organization.

- Types of MOSs - Basic, Primary MOS (PMOS), Necessary MOS (NMOS), Free MOS (FMOS), Exception MOS (EMOS) and Additional MOS (AMOS).
- Additional MOS (AMOS) - Any existing PMOS awarded to a Marine who already holds a PMOS. Example: After a lateral move a Marine's previous PMOS becomes an AMOS. Marines are not promoted in an AMOS.
- Free MOS (FMOS) - Non-PMOS that can be filled by any Marine regardless of primary MOS. A free MOS requires skill sets unrelated to primary skills.
- Primary MOS (PMOS) - Used to identify the primary skills and knowledge of a Marine. Only enlisted Marines, Warrant Officers, Chief Warrant Officers, and Limited Duty Officers are promoted in their primary MOS. Changes to an Active Component Marine's PMOS without approval from CMC (MM) and changes to a RC Marine's PMOS without approval from CMC (RA) are not authorized (p. xii – xiv).

b. Military Occupational Specialty Requirements

- The MOS describes a group of skills and related duties that extend over one or more grades. Each MOS consists of a four-digit code and a descriptive title.
- Criteria to be considered in establishment of an MOS include the number of Marines required in the specialty, training requirements, specialty requirements/ prerequisites, and career pattern.
- MOSs are used to identify skill requirements of billets in T/Os and they are assigned to Marines who meet the qualifications to be awarded an MOS (p. 23).

2. Selected MOSs Relevant to Energy Management

This section lists the MOSs relevant to energy management along with an excerpt from the MOS manual summaries as they relate to energy management responsibilities. Also included is the related Standard Occupational Classification title and code (see Bureau of Labor and Statistics (BLS) crosswalk: http://www.bls.gov/soc/) for comparable civilian positions.

In consultation with E2O, MOSs that have been identified as relevant to energy management are provided in Table 2. Each MOS was identified as a planner or major consumer (or both) of energy and thus relevant to the energy management discussion.

Table 2. MOSs Relevant to Energy Management

OCCFLD/ MOS	MOS Title
0402	**Logistics Officer**
0491	Logistics/Mobility Chief
0505	MAGTF Planners
0511	MAGTF Planning Specialist
0602	**Communications Officer**
0699	Communications Chief
1120	**Utilities Officer**
1169	Utilities Chief
1302	**Combat Engineer Officer**
1310	**Engineer Equipment Officer**
1330	**Facilities Management Officer**
1390	**Bulk Fuel Officer**
1391	Bulk Fuel Specialist
3510	**Motor Transport Maintenance Officer**
3531	Motor Vehicle Operator
3534	Semitrailer Refueler Operator
3537	Motor Transport Operations Chief

To limit the scope, the thesis examines the energy management responsibilities inherent only in the Officer MOSs of 0402, 0602, 1120, 1302, 1310, 1330, 1390, and 3510. There is no MOS specifically designated to manage energy in the Marine Corps.

The following sections examine the responsibilities of each of the relevant MOSs as they relate to energy management. All responsibilities and tasks are listed as found in NAVMC 1200.1A at the page numbers provided.

a. Occupational Field 04, MOS 0402 Logistics Officer (2ndLt to LtCol)

Primary energy management responsibilities of the logistics officer include identification of requirements, management, and distribution of resources, given a tactical or operational scenario. For the Marine Corps, operational energy is derived from one source: fuel. Among the many roles and responsibilities a logistics officer may hold, roles in planning, operations, and execution of distribution are critical to fuel management. The logistics officer is responsible for the following leadership tasks:

- Plan, coordinate, and execute and/or supervise the execution of all logistics functions to include functional areas of tactical logistics: supply, maintenance, transportation, general engineering, health services, and services.
- Serve as commanders or assistants to commanders of tactical logistics units/ elements and as members of general or executive staffs in the operating forces, supporting establishments, and joint staffs.
- Perform the duties of Operations Officer; Plans Officer; Motor Transport Officer; and Convoy Commanders.
- Responsible for administrative and tactical unit movement of personnel, supplies and equipment by all modes of transportation (p. 1–22).

(1) Related Standard Occupational Classification (SOC) Title and Code:

(1) Logisticians 13–1081.

b. Occupational Field 06, MOS 0602 Communications Officer (2ndLt to LtCol)

Primary energy management responsibilities of the communications officer include identification of energy requirements and planning for expected consumption and resupply, given a tactical or operational scenario. Tactical communications equipment relies on electricity provided by fuel-powered generators. Therefore, the communications officer must account for the fuel required to sustain all mission essential tasks assigned. The communications officer is responsible for the following leadership tasks:

- Supervise and coordinate all aspects of the planning, operation, displacement and maintenance of data, telecommunications, radio systems, and computer systems (p. 1–35).

(1) Related Standard Occupational Classification (SOC) Title and Code:

(1) Network and Computer Systems Administrators 15–1071.

c. Occupational Field 11, MOS 1120 Utilities Officer (WO to CWO5)

Primary energy management responsibilities of the utilities officer include identification of energy requirements and planning for expected consumption and resupply, given a tactical or operational scenario. Tactical utility equipment relies on electricity provided by fuel-powered generators. Therefore, the utilities officer must account for the fuel required to sustain all mission essential tasks assigned. The utilities officer is responsible for the following tasks:

- Liaison with DOD Project Manager Expeditionary Energy & Sustainment Systems (PM E2S2), the Marine Corps' Expeditionary Energy Office (E2O), the Joint Water Resources Management Action Group (JWRMAG), and other government agencies to provide an effective and beneficial interface, at the Joint level

- Serve as the most qualified persons to address Marine Corps utilities requirements and to ensure the Corps remains on the cutting edge of technology regarding expeditionary energy (p. 1–42).

(1) Related Standard Occupational Classification (SOC) Title and Code:

(1) General and Operations Manager 11–1021.

(2) Civil Engineers 17–2051.

d. Occupational Field 13, MOS 1302 Combat Engineer Officer (2ndLt to LtCol)

Primary energy management responsibilities of the combat engineer officer include identification of energy requirements and planning for expected consumption and resupply, given a tactical or operational scenario. Combat engineer equipment relies on electricity provided by fuel powered generators and bulk fuel products for tactical vehicle assets. Therefore, the combat engineer officer must account for the fuel required to sustain all mission essential tasks assigned. The combat engineer officer is responsible for the following tasks:

- Command or assist in commanding engineer units consisting of Marines in various MOSs whose duties include storage and dispensing of bulk fuel products; and the installation, operation and maintenance of Tactical Utility Systems (p. 1–44).

(1) Related Standard Occupational Classification (SOC) Title and Code:

(1) Construction Managers 11–9021.

(2) Engineer Managers 11–9041.

(3) Military Officer Special and Tactical Operations Leaders/Managers, all other 55-1019.

(4) First-Line Supervisors/Managers of Transportation and Material-Moving Machine and Vehicle Operators 53–1031.

(5) First-Line Supervisors/Managers of Construction Trades and Extraction Workers 47–1011.

(6) Explosives Workers, Ordnance Handling Experts, and Blasters 47–5031.

(7) First-Line Supervisors/Managers of Mechanics, Installers, and Repairers 49–1011.

e. Occupational Field 13, MOS 1310 Engineer Equipment Officer (WO to CWO5)

Primary energy management responsibilities of the engineer equipment officer include identification of energy requirements and planning for expected consumption and resupply, given a tactical or operational scenario. This MOS also advises planning staffs on the employment and readiness of all equipment, a critical component in fuel management. Engineering equipment relies on electricity provided by fuel powered generators and bulk fuel products for tactical vehicle assets. Therefore, the engineer equipment officer must account for the fuel required to sustain all mission essential tasks assigned to the equipment on his T/E. The engineer equipment officer is responsible for the following tasks:

- Manage and coordinate engineer equipment employment, repair, and related metalworking activities in support of all engineering and material handling tasks associated with mobility, counter-mobility, general engineering, and logistics operations.
- Perform duties of a Special Staff Officer at the battalion or general staff level, providing advice in equipment employment, material readiness, and qualification/ training (p. 1–45).

(1) Related Standard Occupational Classification (SOC) Title and Code:

(1) First-Line Supervisors/Managers of Transportation and material-moving Machine and Vehicle Operators 53–1031.

(2) First-Line Supervisors/Managers of Construction Trades and Extraction Workers 47–1011.

(3) First-Line Supervisors/Managers of Mechanics, Installers, and Repairers 49–1011.

(4) Construction Managers 11–9021.

f. Occupational Field 13, MOS 1330 Facilities Management Officer (2ndLt to Gen)

Primary energy management responsibilities of the facilities management officer include identification of installation facility energy requirements and planning for energy efficiencies. The facilities management officer is responsible for the following tasks:

- Assist commanders in carrying out their responsibilities to obtain, maintain, and operate facilities needed for mission accomplishment.
- Perform facilities maintenance planning, budgeting, and execution with billets as facilities maintenance plans officer and facilities maintenance officer.
- At HQMC, perform plans and policy formulation for base realignment and closure, real property maintenance activities, and family/bachelor housing (p. 1–46).

(1) Related Standard Occupational Classification (SOC) Title and Code:

(1) Administrative Services Managers 11–3011.

(2) First-Line Supervisors/Managers of Mechanics, Installers and Repairers 49–1011.

(3) Construction Managers 11–9021.

g. Occupational Field 13, MOS 1390 Bulk Fuel Officer (WO to CWO5)

Primary energy management responsibilities of the bulk fuel officer include management of fuel requirements and planning for expected consumption and redistribution, given a tactical or operational scenario. Therefore, the bulk fuel officer must account for the fuel required to sustain all mission essential tasks assigned. The bulk fuel officer is responsible for the following tasks:

- Plan, coordinate, and supervise the receipt, storage, transfer, and distribution of bulk fuel.
- Develop bulk fuel site security plans, emplace bulk fuel systems, and write the bulk fuel portion of operation orders (p. 1–47).

(1) Related Standard Occupational Classification (SOC) Title and Code:

(1) First-Line supervisors/Managers of Production and Operating Workers 51–1011.

(2) Petroleum Pump System Operators, Refinery Operators, and Gaugers 51–8093.

(3) First-Line Supervisors/Managers of Mechanics, Installers, and Repairers 49–1011.

h. Occupational Field 35, MOS 3510 Motor Transport Maintenance Officer (WO to CWO5)

Primary energy management responsibilities of the motor transport maintenance officer include identification of fuel requirements and planning for expected consumption and resupply, given a tactical or operational scenario. Tactical vehicles and associated equipment rely on fuel and electricity provided by fuel powered generators. Therefore, the motor transport maintenance officer must account for the fuel required to sustain all mission essential tasks assigned. The motor transport maintenance officer is responsible for the following tasks:

- Plan, coordinate, execute and/or supervise the execution of all functions of motor transport.
- Responsible for training of operation and maintenance personnel, equipment readiness and availability and administrative and tactical unit movement of personnel, supplies and equipment by ground tactical motor transport methods.
- Responsible for the performance of duties as a Special Staff Officer with respect to motor transport operations and maintenance (p. 1–140).

(1) Related Standard Occupational Classification (SOC) Title and Code:

(1) First-Line Supervisors/Managers of Mechanics, Installers, and Repairers 49–1011.

3. Training and Readiness (T&R) Manuals

Marine Corps doctrine has not yet been updated to include operational energy management; therefore, the USMC T&R manuals do not reflect individual or unit level events regarding energy management. The following T&R manuals exist for each of the above

identified MOSs. Each includes individual events associated with logistics, fuel, equipment, or utilities management, but nothing specific to energy management.

a. NAVMC 3500.12B with Changes 1–4, Utilities and Engineer Training and Readiness (T&R) Manual

- Chapter 7 MOS 1120 Utilities Officer
- Chapter 13 MOS 1302 Combat Engineer Officer
- Chapter 14 MOS 1310 Engineer Equipment Officer
- Chapter 23 MOS 1390 Bulk Fuels Officer
- Not listed MOS 1330 Facilities Management Officer

b. NAVMC 3500.27B Logistics Training and Readiness (T&R) Manual

- Chapter 4 MOS 0402 Logistics Officer

c. NAVMC 3500.56B Communications Training and Readiness (T&R) Manual

- Chapter 5 MOS 0602 Communications Officer

d. NAVMC 3500.39C Motor Transport Training and Readiness (T&R) Manual

- Chapter 4 MOS 3510 Motor Transport Maintenance Officer

B. DATA SOURCES

1. Tables of Organization

A truncated version of the Marine Corps Tables of Organization (T/O) titled the *Unit Rollup Report* within the Total Force Structure Management System (TFSMS) was used to examine the fiscal year (FY) 2016 billets across the Marine Corps. The report provided all essential data elements required for analysis, but removed the excess data associated with the Table of Equipment (T/E) not required for this study.

Examination of energy billets on the FY16 T/O was limited by the categorization of data and inconsistent labeling across organizations. First, by searching billet descriptions, only 15 energy billets were identified, one as the military director of the E2O and the others as civilian positions within MCICOM and its installation commands. Second, the T/O allowed for an analysis of relevant billets by MOS and unit. A limitation to the T/O is that the billet description

is the only discriminator between billets of the same MOS within a unit. It does not identify actual billet responsibilities or collateral duties. This differs from the Navy in that it provides less information in a reportable format for a more detailed task analysis. If more billets exist in the energy management field than were identified on the T/O by billet description, there is no easy way to identify them. For instance, the only military billet with "energy" in the billet description was the director of E2O. None of the other E2O staff, military or civilian, were identifiable by billet description.

The T/O revealed that of the 14 civilian T/O billets, the majority of major installations were represented. The most glaring absences were that of Camp Lejeune and Okinawa. This could be due to contracted personnel filling management roles, billet descriptions do not adequately capture job titles, or no energy managers exist. The billet descriptions that include the identifying word "energy" are listed in Table 3.

Table 3. Civilian Energy Management Positions on FY16 T/O

Unit Name	Pay Grade	Billet Description	BMOS
MAGTF TRNG COM TWENTYNINE PALMS, CA	07	ENGINEERING TECHNICIAN (ENERGY MANAGEMENT)	0802
MCAS BEAUFORT ,SC	12	ENERGY UTILITIES MANAGER	0801
MCAS BEAUFORT, SC	11	ENERGY MANAGEMENT SYSTEM SPECIALIST	0802
MCAS MIRAMAR, CA	12	ENERGY CONSERVATION PROGRAM MANAGER	0301
MCAS MIRAMAR, CA	12	ENERGY SYSTEMS SPECIALIST	0301
MCICOM	13	ENERGY MANAGER	0343
MCICOM	14	ENERGY PROGRAM MANAGER	0301
HQTRS MCINCR- MCB QUANTICO, VA	13	UTILITIES AND ENERGY DIRECTOR	1601
HQTRS MCINCR- MCB QUANTICO, VA	12	ENERGY UTILITIES MANAGER	0801
H&S BN MCIWEST-MCB CAMPEN, CA	13	ENERGY RESOURCE MANAGER	0301
H&S BN MCIWEST-MCB CAMPEN, CA	12	ENGINEER (ENERGY)	0808
H&S BN MCIWEST-MCB CAMPEN ,CA	12	ENERGY CONSERVATION SPECIALIST	1601

Unit Name	Pay Grade	Billet Description	BMOS
MCLB BARSTOW, CA	11	ENERGY RESOURCE MANAGER	0301
MCLB ALBANY, GA	12	ENERGY MANAGER	0301

The civilian occupational codes linked to energy related billets on the FY 2016 T/O are included in Table 4. For a full description of each occupational group and series, see Appendix H.

Table 4. Energy Related Civilian Occupational Codes on FY16 T/O

OCCUPA-TIONAL GROUP	OCCUP-ATIONAL SERIES	TITLE
0300		0300 – GENERAL ADMINISTRATIVE, CLERICAL, AND OFFICE SERVICES GROUP
	0301	0301 – Miscellaneous Administration and Program Series**
	0343	0343 – Management and Program Analysis Series**
0800		0800 – ENGINEERING AND ARCHITECTURE GROUP
	0801	0801 – General Engineering Series***
	0802	0802 – Engineering Technical Series***
	0808	0808 – Architecture Series***
1600		1600 – EQUIPMENT, FACILITIES, AND SERVICES GROUP
	1601	1601 – Equipment, Facilities, and Services Series***

Civilian occupational series codes (similar to the military MOS) are listed as a BMOS in the T/O excerpt provided in Table 3.

As there is no MOS designator for energy management, the T/O provides little in the way of analysis by unit or location. To identify relevant T/O billets, the thesis examines the distribution of energy related MOSs across Marine Corps commands. Billets with the MOSs previously identified as associated with energy management are located primarily at the MEF or Marine Expeditionary Brigade (MEB) level or below. The MEF G-3 Operations Office typically

includes a Bulk Fuels Officer, Engineer Officer, and other staff. The G-4 Logistics Office typically includes Marines with a background in transportation and utilities (water, electric, air conditioning, and heating). Within the MEF's Major Subordinate Commands (MSC) the following direct support organizations exist, as shown in Table 5.

Table 5. MEF Major Subordinate Commands

Major Subordinate Command (MSC)	Major Subordinate Element (MSE)
Marine Logistics Group (MLG)	Combat Logistics Battalions (CLB); Engineer Support Battalions (ESB)
Marine Division (MARDIV)	Combat Engineer Battalions (CEB)
Marine Air Wing (MAW)	Marine Wing Support Squadrons (MWSS)

Within the MSCs engineering, utilities, communications and motor transportation units typically exist at the regiment or squadron level and below. These units are major consumers of energy in their daily operations. For those units that maintain an aviation presence, the MWSS coordinates all logistical energy requirements with the exception of aviation fuel, which falls under the Navy's purview. The majority of relevant MOS billets are assigned to MEF major subordinate commands. Logistics and engineering responsibilities fall primarily to the combat logistics battalion, engineer support battalion, combat engineer battalion or Marine wing support squadron.

2. MOS Precedents

As with energy, the federal government did not always have the requirement to manage hazardous materials. Title 49 of the Federal Code of Regulations (2016) establishes the necessity for federal agencies to institutionalize the management, distribution, and disposal by assigning an occupational specialty. The Marine Corps MOS 8056 Hazardous Material/Hazardous Waste (HM/HW) Officer is assigned as a free MOS upon successful completion of a HQMC approved school that "provides fundamental information on the safe and proper management of HM/HW and associated facilities in accordance with applicable" regulation (DON, 2015a, p. 1–231). The

Marine Corps could use MOS 8056 as a template for a new Free MOS for an Energy Management Officer. See Appendix F for an example MOS manual entry for an Energy Management Officer.

On the FY16 T/O, 812 billets are assigned the additional free MOS of 8056. Of those, 517 billets are located within the MEF and major subordinate commands. The remainder is assigned to supporting establishments or reserve units. The number of billets with free MOS 8056 assigned to MEF units are provided in Table 6.

Table 6. Number of MOS 8056 Assigned to MEF Units

UNIT ROLLUP NAME	Grand Total
I MEF	227
II MEF	189
III MEF	101
Grand Total	517

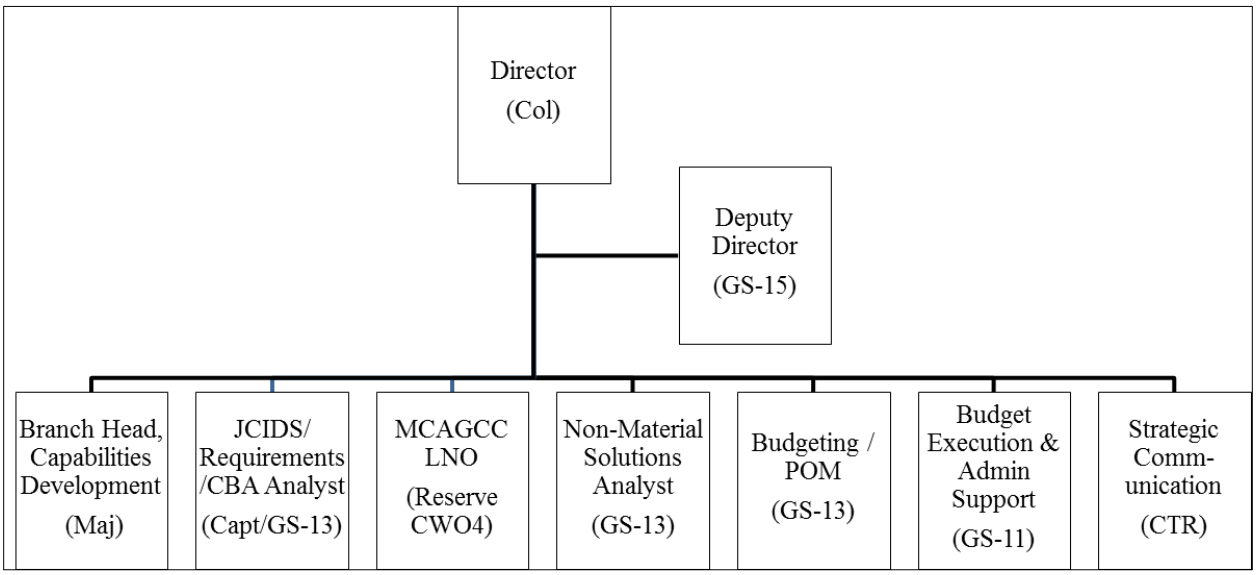
The exact number and location of billets as assigned on the T/O is identified throughout the force structure process. Using MOS 8056 as a template for building the initial force structure requirements of energy management would allow the Marine Corps a building block upon which to add future capabilities. Once in place, the T&R manual lists the training and education courses required to obtain the MOS. Options include certifying the UEM training package, NPS graduate degrees, TECOM developed course packages, or accredited training located elsewhere in DOD or government associated institutions

3. Energy Management Organizational Structure of E2O and MCICOM

The tables of organization lacked sufficient clarity to identify both E2O and I&L/MCICOM energy management billets and organizational structure. The following organizational charts identify the offices' organizational structure, billet titles, and ranks or contracted positions, if known.

Located within the Capabilities Development Directorate of DC, CDI, the E2O includes a staff of military, GS civilians, and one contracted position. The director is a military member holding the rank of colonel. The deputy director is a GS-15. The structure of the E2O office allows the staff to maximize input across all functional areas, accounting for energy requirements in all future capability development discussions. The E2O organization is illustrated in Figure 11.

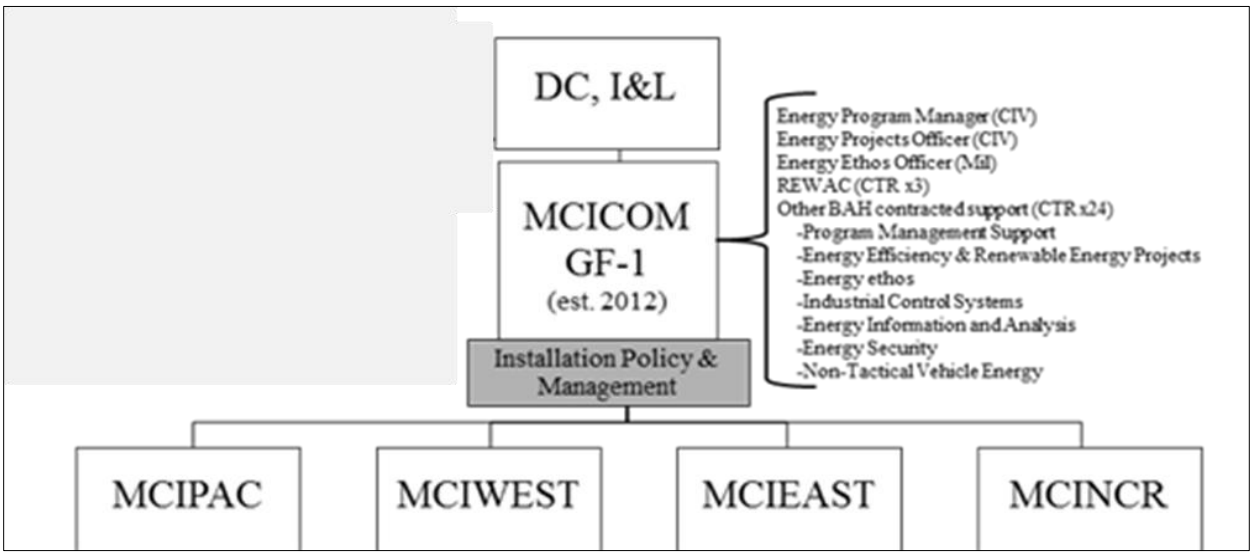
Figure 11. E2O Organizational Chart



Source: E2O (M. Prato, personal communication, February 11, 2016).

Located within Installations and Logistics command, the I&L and MCICOM GF-1 energy offices include a mix of military, civilian, and contracted personnel. Senior civilians manage the department and energy projects. As of FY16, contracted personnel support 27 positions in energy management and policy development billets. The MCICOM billets are shown in Figure 12.

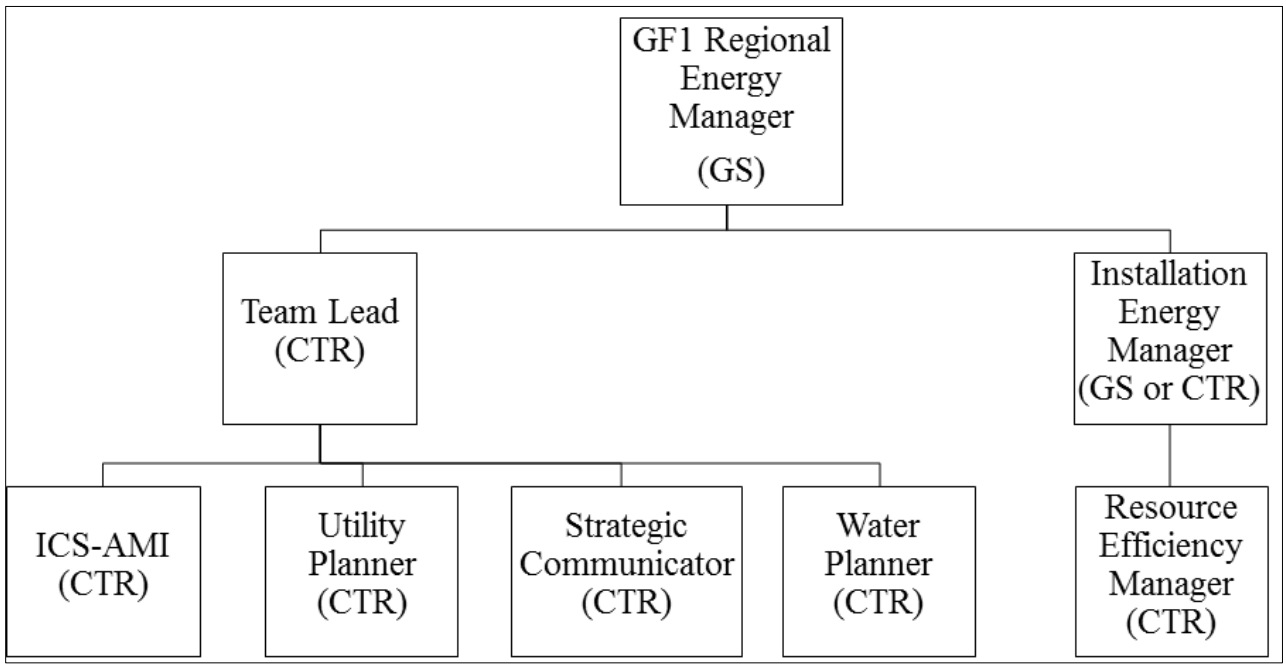
Figure 12. MCICOM Energy Management Team



Source: MCICOM GF-1 (S. Houldsworth, personal communication, February 4, 2016).

MCICOM regions include Marine Corps Installations (MCI) West (MCIWEST), MCIEAST, MCIPAC (pacific region), and MCINCR (north capitol region/DC metro region). Each region is structured on the needs of the installation and region specific requirements. For instance, MCIWEST deals with intense heat and severe drought and therefore, has structured its energy management team to capitalize on solar power for renewable energy but is also laden with water conservation policies and restrictions in the state of California. The MCIWEST energy management team is located within the MCIWEST G-4 Logistics branch (GF-1). The FY16 MCIWEST organization structure is shown in Figure 13.

Figure 13. MCIWEST Energy Management Team



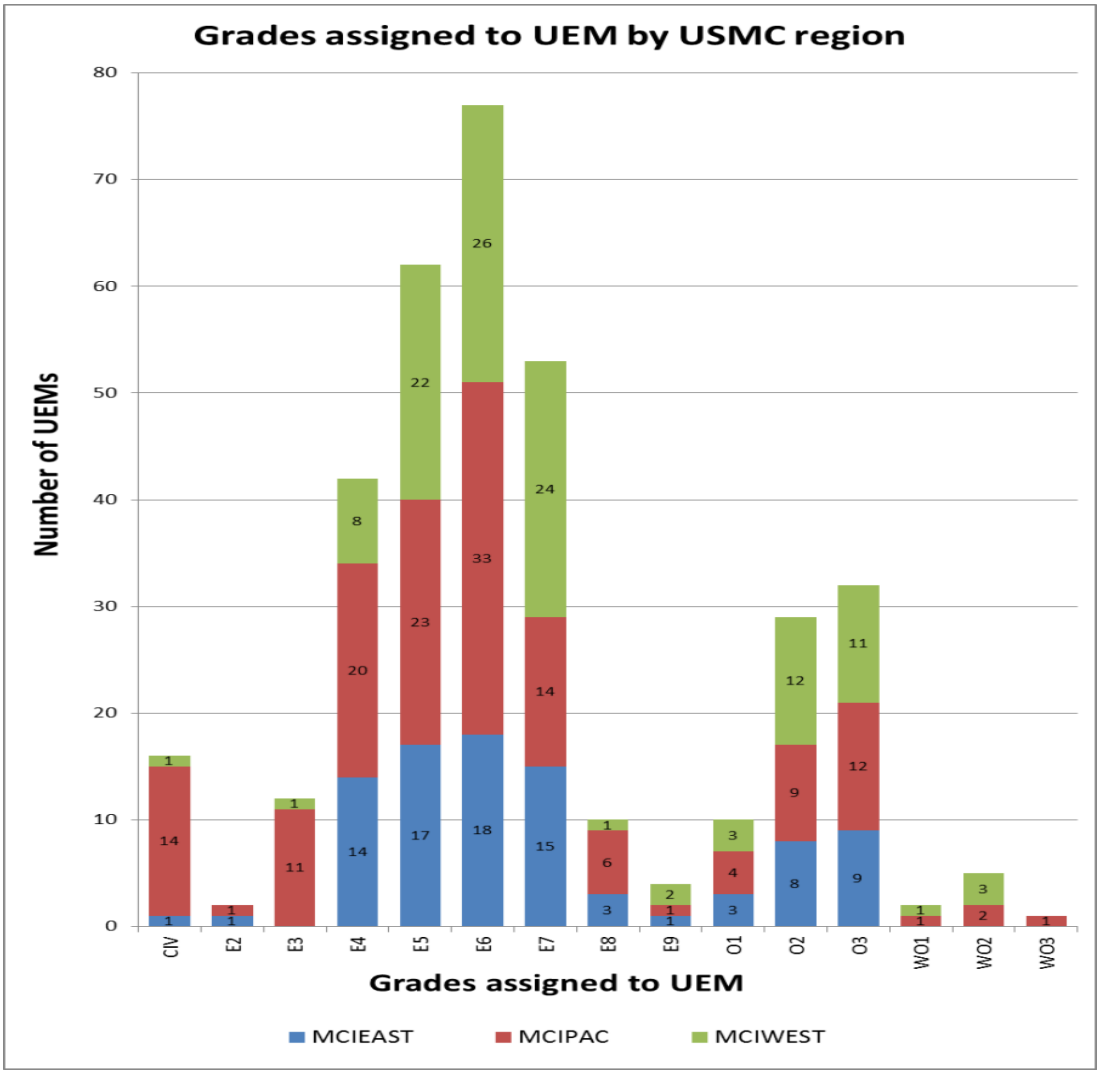
Source: MCIWEST GF-1 (M. Daily, personal communication, January 21, 2016).

4. Unit Energy Manager Analysis

Each installation within each region is required to appoint an Installation Energy Manager who is responsible for managing the new Unit Energy Manager (UEM) position, made mandatory for all installation tenant commands in 2015 (HQMC, 2015a). UEM participation is mandatory and commanders have signaled the importance of the initiative by assigning mostly staff non-commissioned officers (SNCO) and company grade officers.

The rank requirement for the UEM is E-4 or above. It was recommended that a SNCO or officer fill the position due to the leadership responsibilities required. The MCICOM Energy Program Office (GF-1) provided the data for analysis (J. O'Reilly, personal communications, January 4, 2016). Data did not include position holder's rank, which would have provided further insight as to where the unit commander believes the position belongs. However, MCICOM reported that the majority of the UEMs belong to the unit S-4 or G-4 section as billet responsibilities align most closely to those sections. The distribution of UEM by grade and region is shown in Figure 14.

Figure 14. Unit Energy Manager Rank Distribution



Compilation of Unit Energy Managers by grade in three major MCICOM regions: MCIEAST, MCIPAC, and MCIWEST as of December 2015. Source: MCICOM GF-1(J. O'Reilly, personal communication, January 4, 2016).

C. EXISTING TRAINING AND EDUCATION ASSETS

1. Naval Postgraduate School

NPS has four Master's degree programs and two specialized courses: Electronic Systems Engineering, Financial Management, Naval/Mechanical Engineering, and Operations Analysis; an Energy Certification Program; and an executive leadership course—Energy Application Focus.

Each year the Marine Corps selects company and field grade officers to attend NPS in a variety of degree programs. The number of students assigned to each degree program depends in part on the needs of the Marine Corps to fill follow on utilization tours upon the Marine's graduation. The numbers of Marines selected in FY16 to attend NPS in the degree programs relevant to energy management are shown in Table 7.

Table 7. FY16 USMC Selected for Energy Focused Curriculum

NPS Curriculum	Number of FY16 USMC students selected
8824 - Electrical Engineering	8
8844 - Financial Management	5
8850 - Operations Research	20
8862 - Material Logistics	6
Grand Total	**39**

Data collected from MARADMINs 494/15 AND 497/15. Note that MOS 8862 tied to the Material Logistics degree programs does not yet have an energy focus.

In FY16, 39 of the 131 Marines selected to attend graduate education were assigned to degree programs that have or arguably could have an energy-focused curriculum. The material logistics program does not currently have the option for an energy-focused curriculum. Due to the relevance of energy management to logistics, energy-focused electives or curriculum is recommended. The degree programs range from 18 to 24 months in length. Matriculation of energy educated officers from NPS yields great knowledge, but at a slow rate of return.

2. Training and Education Command

The Marine Corps' Training and Education Command's (TECOM) is designed to develop and provide training to meet the capabilities of the service as identified in strategy, policy, and doctrine. The TECOM website identifies its mission as:

> To develop, coordinate, resource, execute, and evaluate training and education concepts, policies, plans, and programs to ensure Marines are prepared to meet the challenges of present and future operational environments (http://www.tecom.marines.mil/Units/Directorates/TrainingandEducationCapabilitiesDivision.aspx.)

The Marine Corps has the opportunity to develop energy specific curriculum to matriculate energy managers at a pace much faster than that of NPS. TECOM's influence extends to all Marines at all levels of education and training. The T&R Manuals identify the required courses available to the MOSs of interest, as illustrated in Table 8.

Table 8. T&R Manual Required Courses

COURSE	COURSE ID	MOS	RANK	MAX SEATS PER YEAR
LOGISTICS OFFICER COURSE	M03LAV7	0402	2NDLT-CAPT	240
BASIC COMMUNICATIONS OFFICER COURSE	M09LC51	0602	2NDLT-CAPT	148
UTILITIES OFFICER COURSE	M03ACE2	1120	WO-CWO	20
COMBAT ENGINEER OFFICER COURSE	M03ACC2	1302	2NDLT-LTCOL	119
ENGINEER EQUIPMENT OFFICERS COURSE	A16ACN1	1310	WO-CWO	25
MARINE CORPS FACILITIES MANAGEMENT COURSE	N18EBKM	1330	2NDLT-GEN	10
PETROLEUM OFFICER COURSE PHASE I	A1431H1	1390	WO-CWO	4
PETROLEUM OFFICER COURSE PHASE II	A1414Z1	1390	WO-CWO	6
MOTOR TRANSPORT OFFICER OPERATIONS COURSE	M03MBJ7	3510	WO-CWO	20

D. CHAPTER SUMMARY

A review of existing Marine Corps tasks, training and readiness events, and relevant MOSs reveals a need for updates to the total force structure process to incorporate energy managers at the tactical level. The easiest solution would be to use the unit energy manager currently in place for both bases and battlefields. Training already occurs for each UEM to fulfill the billet responsibilities. The E2O office should capitalize on the accessibility of the billet and

partner with MCICOM to update the training with an operational focus and operational checklist. The next solution would be to train the officers in the relevant MOSs identified to ensure energy considerations are captured at the management level. The hardest and most burdensome solution is to add an MOS or hire additional GS civilians to fill the gap created by the energy initiatives.

IV. RESULTS

A. OVERVIEW

Chapter III introduced an analysis of the existing manpower force structure in place to support Marine Corps energy initiatives. The chapter identified the robustness of installation energy management compared to operational energy management. The Marine Corps must develop its operational energy doctrine in order to establish a comparable military footprint in energy management beyond basic behavior changes. Assuming that doctrine is created, the following courses of action are feasible manpower solutions to support operational energy requirements using the organizational structures already in place. The Unit Energy Manager program—led, trained, and managed by MCICOM at the regional level—may be the most optimal source of personnel for operational energy requirements. Using existing TECOM courses and resources to incorporate quality energy training and education to existing MOS curricula, the Marine Corps can matriculate and sustain greater numbers at a faster pace. Finally, should the Marine Corps elect to designate an MOS for energy management; this would require development of doctrine and a full top-down mission-function-task analysis within the TFSP.

B. USING THE UEM FOR OPERATIONAL ENERGY

The Marine Corps requires that each installation tenant command appoint a Unit Energy Manager. The UEM receives a standard training package developed by I&L and MCICOM energy offices. Each MCICOM region also delivers installation or region specific energy training. As previously mentioned, the tenant commands of MCIWEST receive additional training in solar and water energy due to the intense heat and drought conditions present in the area. The regional strategic communications officer and/or the Installation Energy Managers deliver the training material to the appointed UEMs.

As of December 2015, training for and responsibilities of the UEM included installation specific requirements only. MCICOM identified approximately 360 appointed and trained UEMs. Six data entries with unrecognizable grades listed were dropped from the analysis. The remaining data show that 62% of the identified UEMs are SNCOs or officers as recommended in

the guidance (HQMC, 2015a). Participation rates of individual grade and grade groups are shown in Table 9.

Table 9. UEM Appointed and Trained Personnel

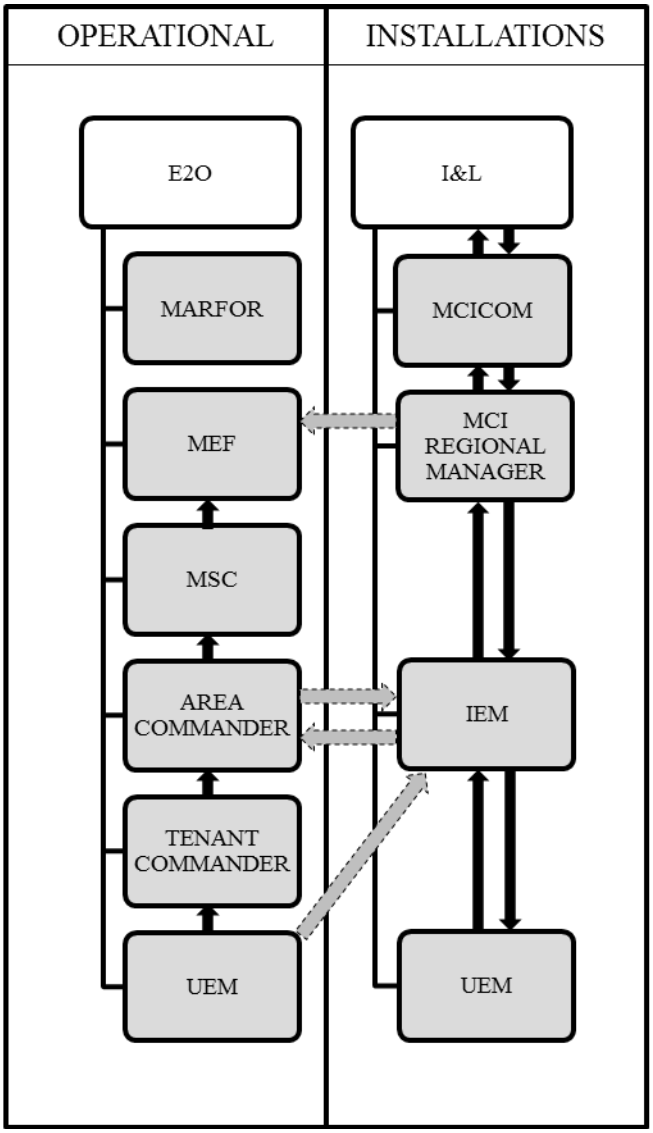
GRADE	TOTAL	GRADE GROUP	% GRADE OF TOTAL UEM	
CIV	16	CIV	4.5%	4.5%
E2	2	NON-NCO	0.6%	3.9%
E3	12		3.4%	
E4	42	NCO	11.8%	29.1%
E5	62		17.4%	
E6	77	SNCO	21.6%	36.4%
E7	53		14.8%	
E8	10	SENIOR SNCO	2.8%	3.9%
E9	4		1.1%	
O1	10	COMPANY GRADE OFFICERS	2.8%	19.9%
O2	29		8.1%	
O3	32		9.0%	
WO1	2	WARRANT OFFICERS	0.6%	2.2%
WO2	5		1.4%	
WO3	1		0.3%	
Grand Total	357		100%	100%

Source: MCICOM GF-1(J. O'Reilly, personal communication, January 4, 2016).

By incorporating an E2O developed training package, the UEM program could immediately inject 360 operationally minded energy managers into the fleet. The Marine Corps could maximize the training and operational reach of this billet within the first round of re-training.

The personnel and training structure already exists under the MCICOM umbrella of authority. The structure exists, but a higher headquarters would have to establish the reporting/ reported, supporting/supported relationships between operational and installation commands. Currently, the UEM belongs to the tenant commander, but reports to and is inspected by the installation energy manager and MCICOM regional office. The relationships between operational and installation commands must be formalized if E2O were to use the structure currently owned by MCICOM. Current energy management relationships are illustrated in Figure 15.

Figure 15. Unit Energy Manager Reporting Relationships



Solid arrows represent formal energy relationships. Dashed arrows represent an informal energy reporting relationship across command authority. Adapted from a discussion with the MCIWEST GF-1 Strategic Communications officer (M. Daily, personal communication, January 21, 2016).

Utilizing the UEM program in place incurs less cost and risk than the other options. Using existing personnel and structure dramatically decrease any personnel costs. The largest cost would be measured in terms of time used in the development of new training materials and the additional man-hours added to the training package for instructors and students. This option does not require placing additional personnel against the USMC end-strength, but only matriculates energy-trained personnel at the rate in which UEMs are reassigned. A significant

risk associated with this option is that the duties remain a collateral billet assigned by the tenant commander and energy management is not institutionalized within the TFSP.

C. DEVELOP TRAINING FOR EXISTING MOS

By developing and adding a standard energy package to the existing basic officer courses of the relevant MOSs, the Marine Corps could add up to 592 (includes active-duty and reserves) energy-trained officers to the fleet annually. A basic two-day training package in energy management would cost the Marine Corps 1,184 Marine days while the officers are in the T2P2 (training, transients, patients, and prisoners) account. Similar costs of a seven-day and 14-day training package are provided in Table 10.

Table 10. Extended MOS Training Option

COURSE	COURSE ID	MOS	RANK	COURSE LENGTH IN DAYS	# COURSE PER YEAR	MAX SEATS PER COURSE	MAX SEATS PER YEAR	MANPOWER COST OF EXTRA 2 DAY	MANPOWER COST OF EXTRA 7 DAYS	MANPOWER COST OF EXTRA 14 DAYS
LOGISTICS OFFICER COURSE	M03LAV7	0402	2NDLT-CAPT	79	6	40	240	480	1,680	3,360
BASIC COMMUNICATIONS OFFICER COURSE	M09LC51	0602	2NDLT-CAPT	147	2	74	148	296	1,036	2,072
UTILITIES OFFICER COURSE	M03ACE2	1120	WO-CWO	15	2	10	20	40	140	280
COMBAT ENGINEER OFFICER COURSE	M03ACC2	1302	2NDLT-LTCOL	111	7	17	119	238	833	1,666
ENGINEER EQUIPMENT OFFICERS COURSE	A16ACN1	1310	WO-CWO	74	1	25	25	50	175	350
MARINE CORPS FACILITIES MANAGEMENT COURSE	N18EBKM	1330	2NDLT-GEN	5	1	10	10	20	70	140
PETROLEUM OFFICER COURSE PHASE I	A1431H1	1390	WO-CWO	47	2	2	4	8	28	56
PETROLEUM OFFICER COURSE PHASE II	A1414Z1	1390	WO-CWO	12	1	6	6	12	42	84
MOTOR TRANSPORT OFFICER OPERATIONS COURSE	M03MBJ7	3510	WO-CWO	38	1	20	20	40	140	280
						TOTALS	**592**	**1,184**	**4,144**	**8,288**

Only the basic officer courses of the relevant MOSs are examined here.

Utilizing the TECOM schools to incorporate energy management training is a medium cost option. Using established TECOM institutions allows the Marine Corps to develop a single education package to all schools or to tailor the education package to specific MOSs as relevant.

This option also applies to the degree programs at NPS and other partnered institutions of higher learning. The Marine Corps could add the energy-focused curriculum to all NPS graduate degrees and executive leadership courses.

Using existing T&E personnel and structures dramatically decrease the personnel costs. The largest cost would be measured in terms of time or added personnel used in the development of new training materials. Additional costs include man-hours added to the training time for instructors and students. This option does not require placing additional personnel against the USMC end-strength and matriculates the greatest number of energy-trained personnel to the fleet. The option also institutionalizes the energy management responsibilities, removing the risk of complacency associated with collateral duties.

D. NEW PRIMARY OR FREE MOS

The Marine Corps must identify and define what operational energy task(s) it requires of a unit in order to assign an MOS to personnel to complete the task. A single task exists on the Marine Corps Task List in regard to energy management and it is specific to installation energy. A task for operational energy management must be included to further drive the TFSP towards creation of energy management billets or development of a new MOS. The Marine Corps' *Total Force Structure Process* requires a comprehensive review of requirements in order to develop force structure (Chapter III).

1. Develop Doctrine and Update USMC Task List

The HQMC (2011a) published operational guidance before developing the prerequisite doctrine required to drive the acquisition of personnel and resources. The strategy and implementation plan included concepts, ideas, and goals but failed to reference specific doctrinal authority. The E2O must conduct a dedicated review of operational requirements and define the operational energy tasks needed of Marine Corps personnel. Appendix K provides a list of operational energy related tasks found on the Universal Joint Task List for future consideration.

2. Develop METs

HQMC's (2015e) TFSP requires that each MET comply with statutory responsibilities. Therefore, "designated USMC units and installations develop METs/METLs to focus for planning, resources and training, and to report operational readiness against Core and Assigned missions" (p. 3–2). METs form the basis for planning and training to ensure mission accomplishment. E2O, or other appropriate advocate for operational and expeditionary energy,

must adjudicate and validate METs, ensure their subordinate MAGTF advocates associate mission statements with METs in TFSMS, and analyze for appropriateness and suitability. Finally, advocates update the appropriate T&R manuals if assigning tasks to specific MOS communities. Appendix G provides an example T&R event titled "enforce energy regulations."

3. Conduct Task Analysis to Identify Force Structure Requirements

DC, CD&I and advocates then conduct a mission-function-task analysis to identify the necessary KSA's, grades and quantities of personnel, and any supporting equipment needed for mission accomplishment. National security and DOD direction has made operational and expeditionary energy management a top-down input into the TFSP, requiring a mission-function-task analysis. Throughputs of the analysis include identification of the manpower and equipment mix for daily operations. Outputs include doctrinal change, and updates or revisions to MOS manuals, T/O, and METs.

Once approved by the Marine Corps Requirements Oversight Council (MROC) and upon signature approval of the CMC, the final outputs trigger decisions cycles in the Human Resource Development Process (HRDP) and life cycle management process.

4. Civilian Hires

Creating billets for civilian positions follows a similar process path to that for a new MOS. Civilian manpower requirements are vetted in the Civilian Uncompensated Review Board (CURB), which is held once a year prior to the POM. Manning the civilian billets is limited by budget constraints and cost per full time equivalent (FTE). Additionally, if deemed inherently governmental the billets must be filled by uniformed personnel or GS civilians. If not inherently governmental or enduring, the USMC would consider hiring contracted personnel. Filling operational billets with civilians however, should be a last resort (HQMC, 2015e).

5. Costs and Risk

Developing a new force structure for an energy management MOS is the most costly and time consuming of the proposed options. The cost in terms of time to develop new doctrine and METs and to complete the mission-function-task analysis process is high and competes with other high priority agenda items at DC CD&I, E2O, and the MAGTF advocates. Once approved,

there is an actual cost in terms of end-strength and associated personnel salary for the grades selected in the MOS modeled. Advocates, subject matter experts, or TECOM would have to develop training and education packages as discussed in the previous options. This course of action poses the greatest risk in terms of delayed capabilities reaching the fleet.

E. CHAPTER SUMMARY

The chapter discussed three available options to develop force structure to support the USMC energy initiatives. The least costly and presumably least burdensome option is to capitalize on the Unit Energy Manager program. Using the UEM for operational energy requires an investment in time and relationship building. Using existing TECOM courses and resources requires significant time and effort to develop quality training material as well as additional time for entry-level accession training. The TECOM option, however, provides the greatest throughput of energy-trained managers over time. Development of a new primary or free MOS is an option should the Marine Corps have the personnel in place to act as developers of doctrine and advocate for billets against end strength. A thorough mission-function-task analysis would reveal whether or not Marine Corps operational energy requirements require a full time position and at what organizational level.

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V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

A. SUMMARY

The thesis examined how the Marine Corps total force structure process currently supports emerging energy initiatives. A thorough review of existing DOD policies and directives provided the background for operational and installation energy requirements. An analysis of the existing force structure, organizational workflows, and training opportunities allowed for an examination of resources available to meet current needs.

The executive office issued several orders and proclamations to the federal government in regard to energy consumption and sustainability. The DOD published strategy, policy, and operational guidance for the military services' role in operational energy. SECNAV directed the Navy and Marine Corps to create, implement, sustain, and manage installation and operational energy requirements. Centralized management teams have stood up; however, formal doctrine and operational energy policy is lacking.

The existing management structure is divided by installation and operational energy requirements. Installation requirements are better defined and thus Marine Corps Installations Command has built a more robust energy management team. The installation teams supervise installation energy programs within the chain of command down to the tenant at each installation. The Expeditionary Energy Office has a small, future-oriented staff, with limited capability to affect day-to-day energy operations.

The Marine Corps has eight military occupational specialties with relevant energy related responsibilities. The training and readiness standards for those job fields do not yet include energy management. Operational energy management deals primarily with the management of utilities and fuel use in tactical vehicles and equipment. Operational commanders do not have access to sufficient metering devices that provide detailed consumption data. Lofty goals exist to reduce consumption, but without data to guide consumption levels, the metrics are not useful in measuring the effectiveness of energy management policies. The examination led to the following conclusions and recommendations.

B. CONCLUSIONS AND RECOMMENDATIONS

1. Primary Research Question

How can the Marine Corps manpower total force structure support SECNAV and USMC energy initiatives?

a. Conclusion

The Expeditionary Energy Office recognizes the capabilities it is seeking from energy management practices but has not defined its energy management requirements in policy or doctrine. Personnel are not assigned to Marine Corps billets that do not have a defined requirement.

b. Recommendation

The Expeditionary Energy Office should identify the operational energy management practices and supporting capabilities the Marine Corps needs to meet its energy objectives. Once identified, the short-term recommendation is to utilize the Unit Energy Manager program to institute initial organizational influence. In a joint effort, MCICOM and E2O can easily modify the UEM training package and distribute changes along the network already in place within MCICOM. A longer-term, more sustainable option is to develop and add HQMC approved energy curriculum to MOS accession training and graduate degree programs.

2. Secondary Research Question 1

What are the policies and directives that support Marine Corps energy management and execution?

a. Conclusion 1

The Marine Corps developed an expeditionary strategy and implementation plan. From that, Marine Corps Installations Command refined the installation energy policies and management practices that had been in place. The Marine Corps however did not develop an overarching operational energy policy or doctrine. Strategy feeds policy, which is used to develop doctrine. Doctrine establishes the service's approach to tasks and training standards.

b. Recommendation

The Expeditionary Energy Office should draft and propose operational energy doctrine to supplement existing publications. It is recommended that E2O update the logistics and fuel management and distribution publications to include energy management language.

c. Conclusion 2

A limitation of the study was the lack of access to any existing energy curriculum materials within Training and Education Command. The Expeditionary Energy Office is interested in TECOM's development of a comprehensive energy-training program. However, without published doctrine and updated training and readiness standards, TECOM is not likely to incorporate operational energy training or education into MOS school curricula.

d. Recommendation

The Expeditionary Energy Office should develop a framework of operational energy tasks expected to come from future doctrine. Training and Education Command should then develop core energy courses to supplement existing MOS training. It is recommended that TECOM use the Department of the Navy's (2015g) Energy Training and Education Plan as a model for subsequent curricula review.

3. Secondary Research Question 2

What military, civilian, or contractor occupations support the requirements of the Department of Defense and Department of Navy and Marine Corps energy programs?

a. Conclusion

The research identified the MOSs of 0402 Logistics Officer, 0602, Communications Officer, 1120 Utilities Officer, 1302 Engineer Equipment Officer, 1330 Facilities Management Officer, 1390 Bulk Fuel Officer, and 3510 Motor Transport Maintenance Officer as the major planners or consumers of energy, both at the installation and operational commands. Centralized management does not exist for Marines in the relevant MOSs nor do they have centralized energy guidance or training. Civilians in the corresponding occupational fields of engineering, facilities, and equipment management are likewise the key billets in installation energy

management. Management and program analysis are also important for civilian supervisory positions in the headquarters offices. Marine Corps Installations Command regional offices have built the requisite teams to manage known requirements. Contracted personnel fill the installation positions not normally attributable to military service. In the case of energy management, contracted positions include analysts, strategic communicators, and specialized engineering and environmental planners. The Expeditionary Energy Office lacks sufficient manpower to allocate time and resources to the development of policy and doctrine. Operational energy management practices are a relatively infantile capability of the Marine Corps.

b. Recommendation

The Expeditionary Energy Office should fund temporary contracted positions to augment the ongoing capabilities development process. To fully institutionalize operational energy management, it is recommended the E2O partner with Marine Corps Installations Command to leverage its contracted support and momentum or to hire a staff capable of developing an equally robust management team. Once this structure is in place, E2O should publish operational energy management guidance to aid the leaders within the relevant MOSs in a more centralized approach to extending combat capabilities.

4. Secondary Research Question 3

What work does the Marine Corps accomplish that expends energy and requires management?

a. Conclusion

The Marine Corps expends energy primarily through electricity and fuel. The installation manages the facilities, land, and resources upon which the tenant (support and operational units) relies. The installation maintains the base utilities and equipment used to maintain or operate the installation. Equipment includes the non-tactical vehicle fleet, renewable and sustainable energy equipment, and generators. Tenant commands consume utilities (electricity and water) as well as operational energy in the form of tactical vehicle fuel, generator fuel, batteries, and other consumables. Generators fueled by petroleum create said electricity for water purification and electricity for command and control suites. Requisition, storage, and distribution of energy

sources all require specialized management to maximize scarce resources and extend the life of systems.

b. Recommendation

Both the Expeditionary Energy Office and Marine Corps Installations Command should develop reasonable and attainable metrics and hold energy managers accountable. It is important to continue metering individual facilities, install smart meters in tactical vehicles, and provide the unit commander the energy data as advertised in the CERP and installation guidance. Leadership must hold commanders accountable through annual or bi-annual inspector general inspections. E2O and MCICOM should provide energy roll-up data to commanders so they can engage with the UEM at the unit level.

C. FUTURE RESEARCH

This thesis examined existing requirements to determine manpower force structure in place to support energy initiatives. There remains a need to evaluate the energy program's effectiveness in reaching its objectives. Recommended future research could occur in the following areas:

- Examine Marine Corps efforts in creating a unified training package. What overarching joint and Marine Corps doctrine has been implemented or should be implemented? What entry-level training has been established? What military occupational specialty training and professional military education curricula have been updated to ensure unity of effort? Has training improved performance in measurable energy metrics?

- Examine the effectiveness of the Unit Energy Manager program. Have the Marine Corps Installations Command regional offices seen improvement in metrics compared to the baseline?

- Examine the energy ethos campaign. Has the ethos campaign demonstrated a significant or observable change in behavior from a baseline?

- Examine practicality of energy metrics. What metrics have been established? Are the metrics reliable, measurable, and relevant? Are metrics annualized to account for seasonal fluctuations? What is the baseline to gauge effectiveness or improvement of metrics? What gradable events have been institutionalized to identify how well energy is managed?

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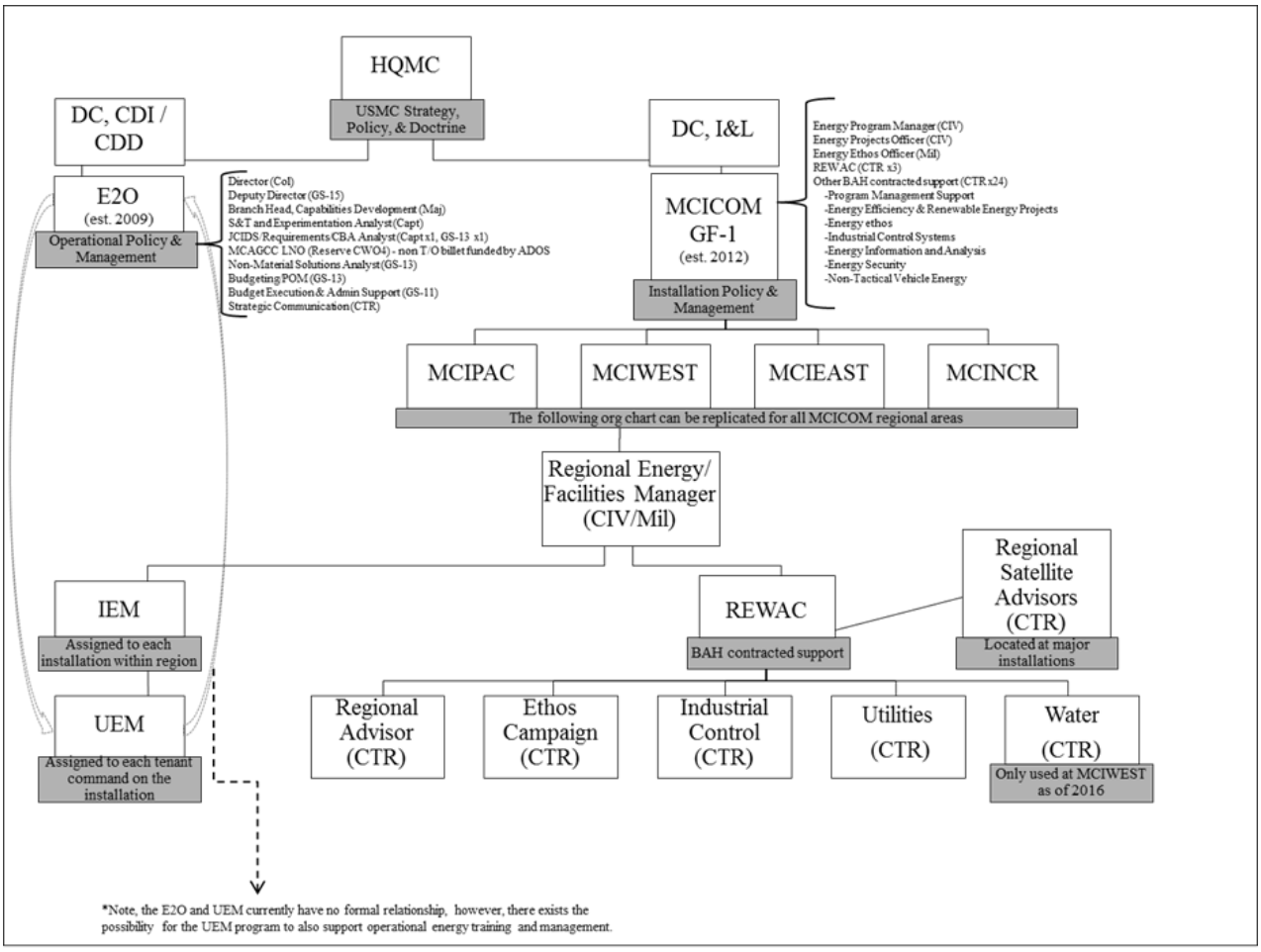
APPENDIX A. USMC ENERGY MANAGEMENT ORGANIZATIONAL STRUCTURE



Adapted from personal communication with E2O, I&L, and MCICOM subject matter experts (SME). Sources: E2O (M. Prato, personal communication, February 11, 2016), MCICOM GF-1 (S. Houldsworth, personal communication, February 4, 2016), and MCIWEST GF-1 (M. Daily, personal communication, January 21, 2016).

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APPENDIX B. INSTALLATIONS ENERGY RESPONSIBILITIES

	ENERGY ETHOS	ENERGY INFORMATION	ENERGY EFFICIENCY	RENEWABLE ENERGY AND ALTERNATIVE FUEL	ENERGY SECURITY
HQMC LF / MCICOM	Update the Installations Energy Strategy as required to ensure guidance is relevant to the execution of the Lines of Operation.	Conduct an evaluation of existing energy information systems in order to publish system and device requirements that address gaps in legacy systems.	Manage the Energy Investment Program (EIP) to provide installation commands the opportunity to implement energy efficiency related restoration and modernization projects.	Implement an enterprise-wide renewable energy plan that matches installations with available renewable resources and technologies. The plan will include a ranking of locations based on potential renewable energy production levels and economic benefit to the Marine Corps. Prioritization will take into consideration mission impacts, local utility rate structures, regulatory constraints, alternative financing mechanisms, and incentives such as renewable portfolio standards (RPS) and RECs as applicable.	Coordinate with higher and adjacent commands to define energy security and develop policy and guidance that informs long-term goals and requirements.
	Implement an internal strategic communication and training plan to engage, educate, and empower staff on resource issues. Identify opportunities to streamline processes and introduce energy and resource efficiency into planning steps.	Develop an Enterprise Energy Information Management (EEIM) plan to standardize requirements for the collection, consolidation, and analysis of energy data across installations.	Develop policy and guidance that establishes roles and responsibilities related to the execution of ESPCs and UESCs.	Evaluate regional command requests for funding to pursue their respective prioritized lists of small-scale installation renewable energy projects.	Coordinate with higher and adjacent commands to develop an energy security template that assists regional and installation commands with the assessment of energy security-related impacts, to include identification of mission critical asset sustainability requirements.
	Develop toolkits that provide installation commands with materials for organizing and initiating, as per the Expeditionary Energy Strategy, a Unit Energy Manager (UEM) program.	Work with higher and adjacent organizations as needed to resolve information assurance and cybersecurity issues of an enterprise energy management system.	Review and approve annual utilization studies to identify and eliminate inefficiencies in NTV fleets. These utilization studies will ensure an effective balance of standard, high efficiency, and AFV technologies in installation NTV fleets to reduce petroleum consumption.	Develop a strategy to ensure sufficient infrastructure is in place to support a transition to a fleet of alternative or electric vehicles.	Execute a resourcing strategy to address energy security vulnerabilities and risk mitigation.
	Coordinate Marine Corps participation in Federal and DoN-sponsored awareness and recognition initiatives.				
REGIONAL COMMANDS	Engage internal staffs to identify opportunities to provide support to installations in developing energy ethos efforts.	Coordinate with subordinate installations regarding respective regional and installation requirements necessary for fielding energy information systems.	Provide installations with guidance and support for performing audits and carrying out needed projects. Regional commands will collect and disseminate lessons learned from audits to help improve processes, develop templates, or bundle projects where applicable. Where beneficial, regional commands will assist Installation Energy Managers (IEMs) with identifying, evaluating, and carrying out projects through channels such as the EIP.	Identify and evaluate specific regional opportunities to implement renewable power generation.	Determine regional energy security policy and guidance.
	Develop regional communications plans to share geographic-specific best practices and lessons learned, as well as developing amplifying guidance on energy resource consumption through metering information and data analysis.		Coordinate with regional NAVFAC and the Resident Officer in Charge of Construction (ROICC) to prioritize LEED credits that obtain financial and energy efficiency return on investment (ROI).	Provide support to installations in developing large-scale renewable projects based on regional energy profile, return on investment (ROI) and energy security requirements.	Coordinate with their subordinate installations to represent local and regional energy security concerns for current infrastructure and future demand impacts.
			Collaborate with HQMC and NAVFAC to identify regional and local ESPC and UESC providers based on technology expertise and demonstrated performance.	Develop and prioritize project lists within their respective region to improve alternative and electric vehicle infrastructure and reduce the dependence of NTV fleet inventories on petroleum based vehicles.	Coordinate with Major Subordinate Command (MSC) headquarters to gain support and assistance with identifying prioritization of mission support.
			Maintain and share awareness of state and local public developments (such as policies and cost-based incentives) as well as the private market landscape, as they affect their subordinate installations' ability to attract and negotiate third party finance options.		Provide technical staff support and guidance to installation commands regarding energy security issues relevant to the geographic region, including coordination with local and regional utilities and local and state regulators and legislators.
			Conduct annual utilization studies to identify and eliminate inefficiencies in NTV fleets. Regional commands will also request infrastructure improvements that promote and support AFVs in their respective subordinate installations' NTV fleets.		
INSTALLATION COMMANDS	Provide energy efficiency training to planning, design, and maintenance staff.	Utilize AMI and associated data management systems to: • Support utility cost tracking and billing functions. • Inform Unit Energy Managers (UEMs) and end-users about energy consumption at tenant and supported commands. • Identify operational efficiency improvements by benchmarking building energy use and measuring energy project performance. • Reduce energy costs through demand reduction and peak shaving strategies.	Perform energy audits to evaluate current energy usage and determine the best locations to incorporate energy savings measures such as ESPCs and UESCs.	Evaluate potential renewable energy sources, to provide reliable power supplies and fuel diversification.	Coordinate with tenant units to conduct annual energy security vulnerability analyses and develop action plans to remove unacceptable energy security risks.
	Designate Installation Energy Managers (IEMs) as the main point of contact for facility energy management issues. IEMs will implement audit programs, identify and prioritize energy projects, promote energy awareness, and coordinate training for tenant UEMs.	Ensure cybersecurity and accreditation of utility and building control systems.	Perform lifecycle cost analyses to justify decisions related to capital investments involving energy-related infrastructure.	Evaluate cost effective military construction and major building renovation projects involving roof replacements that incorporate roof-top solar thermal, photovoltaic, and/or energy-reducing coating technologies.	Ensure that COOP plans address energy emergency preparedness and protection and restoration of mission critical and essential functions.
	Establish UEM programs at the battalion and squadron level to provide a single point of contact within each organization. UEMs will serve as each command's advisor on energy and water management, and will actively promote energy awareness and reduction opportunities.	Integrate energy information into centrally managed data systems that support near real-time command and control of energy management and building control systems.	Ensure that all building new construction and major renovations meet LEED Silver criteria, achieving a minimum of 40 percent of LEED credits from the Energy and Atmosphere (EA) and Water Efficiency (WE) sections.	Offer cost-effective alternative fuel vehicles (AFVs) and coordinate with facility managers, and local and regional fleet managers, to ensure that any vehicle acquisitions have sufficient infrastructure to support the intended design and fuel source.	
	Utilize public affairs campaigns to increase awareness and publicize program goals, tools, and progress at different organizational levels through web sites, conferences, e-mails, displays, reports, newsletters, handbooks, and guidance.	Integrate improved fuel management systems using telematics to better track NTV fuel usage.	Implement demand reduction and peak shaving strategies to reduce overall installation energy costs.	Collaborate on renewable generation projects that could benefit from an increased presence of battery electric vehicles (BEVs). BEVs can be used to increase load for renewable power generation and can provide a ready source of battery storage for microgrid stability.	
	Develop incentive and accountability programs that target individuals and organizations, and publicly recognize energy saving efforts and reward energy conserving behavior.		Optimize the use of NTVs and ensure compliance with efficiency-related policies.		
			Adopt efficient and alternative fuel vehicle technologies and commercially available vehicle telematics that assist NTV users and managers in reducing unnecessary petroleum use wherever cost-effective.		

Adapted from: Headquarters Marine Corps. (2015b). *USMC installations energy strategy*. Washington, DC: MCICOM.

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APPENDIX C. SELECT UEM PROGRAM INFORMATION

ENERGY ETHOS

The Energy Ethos is the shared vision that the efficient use of energy resources is a critical component of mission readiness. This vision supports the Marine Corps mission by ensuring energy resiliency, reducing facility operating costs, and fostering a culture of efficient energy usage throughout the Corps.

For more information on Marine Corps Energy please visit the Marine Corps Installations Command (MCICOM) Facility Operations and Energy (GF-1) website: *http://www.mcicom.marines.mil/Units/GFFacilities/GF1Energy.aspx*

WHAT IS THE UEM PROGRAM?

The Unit Energy Manager (UEM) Program will lay the foundation for the implementation and adoption of an Energy Ethos throughout the Marine Corps. Through the program, one Marine in each tenant unit on every installation will be appointed as the point of contact for energy issues to their unit leadership and fellow Marines. The UEM Program will provide Operational Commanders with greater visibility of resources, and assist the Marine Corps in spreading a culture of conservation across our installations.

UEM RESPONSIBILITIES

- Communicate installation energy goals and objectives to Marines in each unit
- Promote and increase awareness on the usage and cost of energy
- Educate fellow Marines on energy and water efficient behaviors
- Serve as the point of contact for energy issues, questions, or problems within each unit
- Identify potential energy-saving opportunities or efficiency projects in facility operations
- Perform regular facility energy walkthroughs
- Assist IEMs, as needed, to gather facility-specific data

GOALS AND GUIDING POLICY

The Marine Corps has invested nearly $1 billion in energy efficiency and renewable energy efforts since FY2003, resulting in an 18.92 percent Energy Use Intensity (EUI) baseline reduction to date. The 2014 Utility Demand Reduction (UDR) Guidance calls for an additional 10 percent reduction in installation utility execution costs by 2020 through behavior change efforts.

UEM communication and education initiatives will guide Marines in developing awareness and acceptance of energy efficiency efforts, and promote their adoption and ownership of the Energy Ethos.

UEM PROGRAM FACTSHEET 1

MCB Camp Pendleton Pilot Program UEMs from left to right: HM3 Joshua Nelson *(Assistant UEM 1st Med Bn)*, HM1 Michael Ortiguero *(UEM 1st Med Bn)*, Sgt Christien Stevenson *(UEM MWSS-372)*, Cpl Stephen Brothers *(Assistant UEM MWSS-372)*

Who else is involved with the UEM Program?

Operational Commanders:

- Assign the UEMs
- Foster a supportive command environment
- Assist in developing and enforcing accountability measures

Installation Commanders:

- Empower IEMs to influence the UEM Program
- Support awareness initiatives and champion efficiency efforts

Installation Energy Managers (IEMs):

- Train the UEMs
- Provide UEMs with monthly utility data
- Review and submit qualitative scoresheets filled out by UEMs
- Identify high-energy use facilities for UEMs to focus their efforts
- Provide UEMs with communications materials
- Work with installation PAO to publicize the UEM program

Marines:

- Improve their energy and water usage habits through increased awareness and education
- Understand their daily energy and water impacts and the importance of energy efficiency for the Marine Corps mission

PILOT PROGRAM SUMMARY

In advance of the full UEM program launch in October 2014, Marine Corps Installations Command (MCICOM) Facility Operations and Energy (GF-1) conducted a pilot program of four units in MCIWEST — MWSS-373 and MWHS-3 at MCAS Miramar, and 1st MED and MWSS-372 at MCB Camp Pendleton. This pilot was initiated to test the framework of the UEM Program Plan and assess the materials designed for the program's use. The UEM Pilot Program was launched on 7 July 2014 and ran through the third week of September. This period of pilot testing illustrated the potential for the program and identified opportunities to further enhance it.

UEM PROGRAM BENEFITS

FOR UEMS:

- Opportunity to develop expertise in the growing field of renewable energy, while also adopting best practices for personal energy savings
- Opportunity to be the unit leader for energy, developing vital leadership skills and gaining credibility
- Opportunities for recognition based on excellent performance (through updates to Marine's billet description, extracurricular activities on their fitness reports, etc.)
- Increased knowledge of installation business, audits, management, communications, and planning
- Ability to understand arguments and contribute to discussions on energy (e.g., Keystone XL Pipeline, energy economics and security, smart grids, and microgrids)
- Exposure to leadership by reporting energy data, sharing best practices, and discussing unit efforts and competitions
- Ability to lead units in energy competitions

FOR USMC:

- Increased energy efficiency will strengthen Marine Corps combat readiness
- Increased energy efficiency directly correlates to higher resiliency from outside threats, natural disasters, and resource scarcity
- Increased savings from energy efficiency allows more funds to be allocated to other mission-critical priorities, such as training

UEM PROGRAM SUPPORT

In addition to this Factsheet, UEMs will be provided materials including a UEM Program Handbook, energy awareness posters, "5 Ways to Save" tip sheets, facility walkthrough checklists, POC list templates, and more. These materials are designed to enhance energy efficiency and awareness efforts and help UEMs more effectively train and communicate with members of their unit.

UEM EVALUATION FACTORS/CHECKLIST

Refs: A) UEM Handbook pages 8-10, B) IEM Handbook, pages 8-12

BUILDING WALKTHROUGHS

___ Building walkthroughs conducted? ___ Number?
___ Building walkthrough checklists completed and provided to IEM?
___ Suggestions for improved efficiency and technology submitted IEM?
___ Number of repairs or activities resulting from facility walkthroughs

DISSEMINATION OF ENERGY INFORMATION MATERIALS

__ Posters and tip sheets distributed to/throughout the unit?
Type of information materials (Check all that apply)
__ Handouts
__ Posters
__ Bulletin Boards
__ Light/Mirror stickers
__ Creation of additional materials unique to your unit or installation's facilities? (If checked, describe_____)

EVENTS

__ Energy awareness events held? __ Number?
Types of events and activities (List)
__ Number and ranks of Marine Participants? (List)
__ Leadership involved in event planning, execution, participation?

PUBLIC AFFAIRS ENGAGEMENT

__ Meetings held with your IEM regarding Public Affairs support of the energy program?
__ Suggestions made by UEM to increase awareness and education through public affairs?
__ UEM ideas, suggestions, activities resulted in media stories, social media posts, etc.?

FEEDBACK TO UNIT

__ Fellow Marines, unit leadership and your IEM provided regularly with energy and water use status updates?_____ How often?
__ Metered data shared by the UEM with the UEM's unit?
__ Energy and Water success stories shared by the UEM with the UEM's Unit?

POTENTIAL PROJECT IDENTIFICATION

__ Energy concerns or vulnerabilities reported?
__ Did Reports lead to any repairs
  __ Number of Work Orders generated for minor repairs?
__ Number of new building or operational efficiency plans or procedures suggested?

WATER

__ Are Marines encouraged to adopt water saving habits (short showers, limited shaving use, etc.?
__ Broken pipes, leaks to pipes, faucets, showerheads or other fixtures been reported?
__ Water wasting habits and activities have been addressed and reported?
__ Lawns and gardens watered only when necessary?

ELECTRONICS AND APPLIANCES

__ Computers shutdown when not in use (depending on policy)?
__ Computer monitors turned off when not in use for extended periods of time?
__ Power Strips utilized/turned off to manage electricity usage?
__ Appliances plugged in when not in use (refrigerators, coffee makers, printers, etc.)?
__ Televisions, game systems, large entertainment systems plugged in when not in use?

HEATING, VENTILATION, AND AIR CONDITIONING

__ Heaters or AC units turned down or turned off when marines leave their room or workplace?
__ Thermostats set to recommended temperatures, considering local humidity levels?
__ Furniture or appliances block vents?
__ Heating or air conditioning vents appear to be clean?
__ Maintenance or facilities staff regularly replace HVAC filers?
__ Window blinds used to assist in naturally cooling or heating a space?
__ Windows and doors properly sealed and closed to avoid loss of heated or cooled air? (Any identified as habitually left open?)

ADMINISTRATIVE

__ Conduct regular energy and water awareness meetings with Unit personnel?
__ Provide regular updates to Unit Leadership?
__ Perform regularly scheduled meter reading duties IOS the IEM/REM where applicable?
__ Perform individual Marine check-in/check-out energy and water awareness surveys?
__ Understand and ensure unit, squadron, building compliance with installation energy and water-related policies and regulations?

UEM Facility Walkthrough

Monthly Checklist

Building #:	Unit:	Installation:
UEM Name:	Telephone:	Email:

**All of the items on this checklist are behavior-related, and follow this action code: "Tell Marines to change behavior."*

Lighting	YES	Corrective Action(s) Taken	Date
Are lights left on in unoccupied common areas, rooms, or offices?			
Are lights on in areas where daylight is sufficient?			
Are Marines using overhead lights instead of using smaller available task lights?			
Electronics / Appliances		**Corrective Action(s) Taken**	**Date**
Are Marines leaving unused electronics or appliances plugged in when not in use?			
Are Marines using power strips to shut off unused electronics and appliances?			
Are Marines leaving computer monitors on when away from their computers?			
Can Marines consolidate appliances like coffee machines, fans, etc. by sharing?			
Heating / Cooling		**Corrective Action(s) Taken**	**Date**
Are entryways open between areas with heat/AC and areas without heat/AC?			
Are windows and exterior doors open during building cooling and heating?			
Is heat or AC on in unoccupied spaces?			
Is the temperature set to 78° in the summer and 68° in the winter?			
Are personal space heaters being used?			
Could blinds or curtains be better used to adjust temperature (open to warm facilities in winter and closed to cool in summer)?			
Water		**Corrective Action(s) Taken**	**Date**
Are Marines leaving water running while brushing teeth, washing face, etc.?			
Are Marines using cool water only to do their laundry?			

X _____
UEM Signature Date

X _____
S-4 Signature Date

MARINE CORPS ENERGY

Unit Energy Manager Facility Walkthrough Checklists

The Facility Walkthrough Checklist will be the primary tool that you, as a Unit Energy Manager (UEM), will use to assess the efficiency of your facilities and report issues to the appropriate point of contact (POC). These checklists should be reviewed with your Installation Energy Manager (IEM) prior to your first set of walkthroughs. All checklists must be submitted to your S-4 or your unit/organization's facilities POC in a timely manner on a schedule determined by your S-4 and/or IEM. Contact your IEM if you are uncertain about the corrective action that needs to occur for any issue noted on the checklist.

Monthly Checklist

- Complete **one checklist per unit building/facility**.
- Complete the checklists in Microsoft Word, digitally sign, and submit to your S-4 (If you are unable to complete in Microsoft Word, print the checklist, complete on paper, scan the completed checklist and then submit to your S-4).
- For each item on checklist:
  1. Read the item carefully
  2. Determine if there is an issue to be fixed
  3. Initiate corrective action
  4. Document corrective action taken with dates
  5. Follow up on corrective actions and document when issues are fixed

Corrective Action Codes	
	Fix the problem yourself
	Call or submit request to energy or facility POC
	Tell Marines to change behavior

Quarterly Checklist:

- Complete the **Quarterly** Checklist near the beginning of each season (Spring, Summer, Fall, and Winter).
- Complete **one checklist per unit building/facility**.
- Complete the checklists in Microsoft Word, digitally sign, and submit to your S-4 (If you are unable to complete in Microsoft Word, print the checklist, complete on paper, scan the completed checklist and then submit to your S-4).
- For each item on checklist:
  1. Read the item carefully
  2. Determine if there is an issue to be fixed
  3. Initiate corrective action
  4. Document corrective action taken with dates
  5. Follow up on corrective actions and document when issues are fixed

⚠ ***For all efforts, it may not be enough to just submit a technical request to a facility or maintenance POC, or tell Marines to change behavior one time. Be sure to continuously monitor the effort and follow up to ensure that changes are made.***

MARINE CORPS ENERGY

Source: Materials received from MCIWEST GF-1 (M. Daily, personal communication, January 21, 2016).

APPENDIX D. TECOM APPROVED COURSES

COURSE	COURSE ID	MOS	RANK	LENGTH IN DAYS	COURSE PER YEAR	MAX SEATS	MAX SEATS PER YEAR
INTERMEDIATE MAGTF LOGISTICS OPERATIONS	M09F2F9	0402/1302/3002;	MAJOR; MSGT-MGYSGT	40	3	50	150
LOGISTICS CAPTAINS CAREER COURSE	A14LBP2	04XX	1SLT-CAPT	133	6	2	12
LOGISTICS OFFICER COURSE	M03LAV7	0402	2NDLT-CAPT	79	6	40	240
BASIC COMMUNICATIONS OFFICER COURSE	M09LC51	0602	2NDLT-CAPT	147	2	74	148
UTILITIES OFFICER COURSE	M03ACE2	1120	WO-CWO	15	2	10	20
ENGINEER CAPTAINS CAREER COURSE	A16RGE1	1302	CAPT	148	1	2	2
COMBAT ENGINEER OFFICER COURSE	M03ACC2	1302	2NDLT-LTCOL	111	7	17	119
ENGINEER EQUIPMENT OFFICERS COURSE	A16ACN1	1310	WO-CWO	74	1	25	25
MARINE CORPS FACILITIES MANAGEMENT COURSE	N18EBKM	1330	2NDLT-GEN	5	1	10	10
PETROLEUM OFFICER COURSE PHASE I	A1431H1	1390	WO-CWO	47	2	2	4
PETROLEUM OFFICER COURSE PHASE II	A1414Z1	1390	WO-CWO	12	1	6	6
BUSINESS SYSTEM MODERNIZATION-ENERGY (BSM-	NONE SPECIFIED	1390	WO-CWO5	NONE SPECIFIED	NONE SPECIFIED	NONE SPECIFIED	NONE SPECIFIED
BUSINESS SYSTEM MODERNIZATION-ENERGY (BSM-	NONE SPECIFIED	1390	WO-CWO5	NONE SPECIFIED	NONE SPECIFIED	NONE SPECIFIED	NONE SPECIFIED
MOTOR TRANSPORT OFFICER OPERATIONS COURSE	M03MBJ7	3510	WO-CWO	38	1	20	20
OPERATIONS AND TACTICS INSTRUCTOR - OFFICER	M09KYD5	GCE RELATED	CAPT-LTCOL	33	3	13	39
ADVANCED LOGISTICS AND TECHNOLOGY (LOGTECH)	C48XJ22	NONE SPECIFIED	MAJ-COL; GS13-GS15	7	4	7	28
JOINT LOGISTICS COURSE (JLC)	A14L232	NONE SPECIFIED	MAJ-LTCOL, GS12-GS14	21	12	4	48
INTERAGENCY LOGISTICS (IL) COURSE	NONE SPECIFIED	NONE SPECIFIED	MAJ-COL, CWO3-CWO5, E7-E9,	5	1	4	4
LOGISTICS FOR THE 21ST CENTURY (LOG21)	NONE SPECIFIED	NONE SPECIFIED	1STLT-MAJ, CWO2-CWO4,	5	1	6	6
SEMINAR ON LOGISTICS COOPERATION FOR	NONE SPECIFIED	NONE SPECIFIED	MAJ-COL, CWO3-CWO5, E8-E9,	5	1	2	2
LIFE CYCLE EXECUTIVE LEADERSHIP PROGRAM (LCELP)	NONE SPECIFIED	NONE SPECIFIED	MAJ-COL, CWO4-CWO5, GS13-	5	1	7	7
DEPOT & ARSENAL EXECUTIVE LEADERSHIP PROGRAM (DAELP)	NONE SPECIFIED	NONE SPECIFIED	O6/GS EQUIVILANT	5	1	2	2
INTRODUCTION TO EXPEDITIONARY LOGISTICS	NONE SPECIFIED	NONE SPECIFIED	1STLT-MAJ, E7-E9, CWO3-	10	1	2	2

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APPENDIX E. MOS MANUAL GLOSSARY AND BUSINESS RULES

Glossary and Business Rules

Categories of MOSs	Occupational Fields 01-79, 80XX, and 90XX.
OccFld 01-79	Occupational Fields that contains all types of MOSs related to a specific occupational field.
80XX: Miscellaneous Requirement MOSs	These MOSs are MOSs that do not fit into a regular OccFlds but are used on the Marine Corps Table of Organization.
90XX: Reporting MOS	These MOSs do not exist on the Marine Corps Table of Organization. They are used to meet Department of Navy and Department of Defense reporting requirements.
Types of MOSs	Basic, Primary MOS (PMOS), Necessary MOS (NMOS), Free MOS (FMOS), Exception MOS (EMOS) and Additional MOS (AMOS).
Additional MOS (AMOS)	Any existing PMOS awarded to a Marine who already holds a PMOS. Example: After a lateral move a Marine's previous PMOS becomes an AMOS. Marines are not promoted in an AMOS.
Basic MOS	Entry-level MOSs required for the P2T2 T/O for entry-level Marines or others not yet qualified by initial skills training. In addition, when a Reserve Component (RC) Marine transfers to a new unit and does not possess the MOS required for the billet filled, he will be assigned a Basic MOS until the completion of required formal school training or is otherwise certified to be MOS qualified.
Billet Designators	An FMOS requirement indicator as a BMOS that can be filled by any Marine appropriate grade that is included in the MOS definition (i.e. MOS 8007 Billet Designator-Unrestricted Ground Officer (I) FMOS). Normally, FMOS as a sill designator cannot be a BMOS in the Total Force Structure Management System (TFSMS).
Exception MOS (EMOS)	Non-PMOS that is generally FMOS, but include exceptions that require a PMOS.
Free MOS (FMOS)	Non-PMOS that can be filled by any Marine regardless of primary MOS. A free MOS requires skill sets unrelated to primary skills.
Necessary MOS (NMOS)	A non-PMOS that has a prerequisite of one or more

	PMOSs. This MOS identifies a particular skill or training that is in addition to a Marine's PMOS, but can only be filled by a Marine with a specific PMOS. When entered as a requirement into the Total Force Structure Management System (TFSMS), a billet bearing a necessary MOS must identify a single associated PMOS even if several PMOSs are acceptable prerequisites.
Primary MOS (PMOS)	Used to identify the primary skills and knowledge of a Marine. Only enlisted Marines, Warrant Officers, Chief Warrant Officers, and Limited Duty Officers are promoted in their primary MOS. Changes to an Active Component Marine's PMOS without approval from CMC (MM) and changes to a RC Marine's PMOS without approval from CMC (RA) are not authorized.
Core Plus Skills	Tasks that are mission, advanced, rank, or billet Specific. These tasks are taught, executed, and evaluated at the unit. Core plus tasks relate to 2000 level Individual Training Standards in the Ground Training and Readiness (T&R) Manual.
Core Skills	Those basic skills that "make" a Marine and qualify that Marine for an MOS. Core skills comprise the set of core tasks for each MOS as found in the relevant to 1000 level Individual Training Standards in the Ground Training and Readiness (T&R) Manual.
Human Resource Development Process (HRDP)	The overarching process that makes the manpower side of combat capability through force structure, manpower, and training sub processes. It determines quantity and skills requirements of the operating force units and supporting establishment, and then attains, classifies, trains, assigns, retains, promotes, and otherwise manages an inventory of Marines to meet those requirements. The HRDP owner is Deputy Commandant Manpower and Reserve Affairs who coordinates with Deputy Commandant Combat Development and Integration for identification and integration of force structure requirements and training.
Prerequisite	Possessing physical, mental, or moral qualities necessary to be assigned to a typical billet for an MOS, or to meet formal school screening requirements.
Required Training	Initial Skills training expected to be received by Marines after completion of recruit training, where core skills training is provided, normally at an MOS producing formal school course. While preferred, this does not limit attaining MOS qualification to formal school graduation as the only source of MOS qualifying training in most

	cases. Career MOS or certification training that may or may not result in a new PMOS. Required career MOS training is expected to be completed by each Marine and limited career potential may result from failure to attain required training.
Requirement	Accomplishments necessary to qualify for an MOS, usually described as graduation from a formal school course approved to award the MOS.
Skill Progression Training	Formal schools training for Marines already holding an MOS, but the training relates directly to increasing overall skills and knowledge in the MOS. All holders of the MOS might be expected to attend, if available.
Skill Enhancement Training	Formal schools or structured training for Marines already holding an MOS. Relates directly to increasing overall skills in the MOS. Usually intended for MOS holders with particular billet requirements.

Source: Department of the Navy (DON). (2015a). Military occupational specialties manual (NAVMC 1200.1A with change 1). Washington, DC: Headquarters Marine Corps.

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APPENDIX F. EXAMPLE MOS MANUAL UPDATE

##. MOS 80XX, Energy Management Officer (Major to 2ndLt) and (CWO3 to WO) FMOS #

a. Summary. Energy Management Officers manage numerous aspects of the Marine Corps energy program. The primary areas of focus are implementing unit energy training programs; communicating installation and operational energy objectives; promoting awareness of energy usage costs; monitoring energy reporting procedures; maximizing consumption reduction; identifying potential energy-saving or efficiency projects; and monitoring energy streams, energy projects in place, and prescribed unit inspections practices. Energy Management Officers will also supervise unit operations to ensure compliance with energy regulations, and maintain the unit's energy related equipment and procedures. In some cases, the Energy Management Officer will serve as the command representative for energy issues, and develop the unit level operating budget inputs as required. The MOS may be assigned only as a FMOS by the CMC (MM) upon a request from the individual or MOS sponsor.

b. Prerequisites

(1) At least 18 months remaining on current EOS.

(2) Must possess normal color vision.

c. Requirements

(1) Successful completion of an HQMC approved formal school(s) or HQMC approved base/installation course(s) of instruction that addresses the duties specified below and provides fundamental information on the proper management of energy utilization and consumption requirements and associated facilities in accordance with applicable federal, Department of Defense (DOD), Department of Navy (DON), and Marine Corps requirements.

(2) MOS 80XX qualifying courses must appropriately address the following requirements to include, but not limited to:

(a) TBD

(b) TBD

(c) TBD

(d) TBD

(3) Continued validity of MOS is contingent upon the Marine Corps maintaining full compliance with all federal, state, and local refresher training requirements.

d. Duties

(1) Distinguishes energy management by installation and operational requirements.

(2) Supervises operations of unit level energy consumption.

(3) Develops/ensures maintenance of desktop procedures and turnover folders.

(4) Supervises and validates the maintenance of unit energy training records.

(5) Conducts and participates in applicable multimedia energy inspections, audits, and evaluations.

(6) Supervises and maintains unit level inspection records and required follow-on corrective actions.

(7) Monitors maintenance of unit level energy publications library.

(8) Directs the unit level Unit Energy Manager program.

(9) Develops and implements the unit level energy ethos training.

(10) Tracks and consolidates unit level energy costs.

(11) Identifies unit level energy operations budget requirements.

(12) Identifies energy training needs and associated budget requirements.

(13) Ensures energy transportation requirements are in compliance with local directives.

(14) Develops and sponsors energy standard operating procedures, letters of instruction, and operations orders for field operations at the unit level for tactical and garrison operations.

(15) Conducts unit level energy briefings.

(16) Serves as the unit point of contact for applicable energy issues.

(17) Promotes energy conservation.

e. Related Standard Occupational Classification (SOC) Title and Code. None.

f. Related Military Skill. None.

#. MOS 80XX above the rank of Captain, the Marine Officer performing duties associated with MOS 80XX should pursue training and education opportunities beyond the scope of this MOS. Review of MOS 8824/8844/8862, Electronics Engineer/Financial Management Specialist/Material Management Officer requirements are recommended.

Adapted from Department of the Navy (DON). (2015a). Military occupational specialties manual (NAVMC 1200.1A with change 1). Washington, DC: Headquarters Marine Corps. *MOS 8056(p. 1–231) used as template

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APPENDIX G. EXAMPLE T&R MANUAL UPDATE

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xxxx-ADMN-20xx: Enforce energy regulations

EVALUATION-CODED: NO **SUSTAINMENT INTERVAL**: 12 months

BILLETS: Platoon Commander, Utilities (or other) Officer

GRADES: WO-1, CWO-2, CWO-3, CWO-4, CWO-5; 2ndLt, 1stLt, Capt, Maj, LtCol

INITIAL TRAINING SETTING: MOJT

CONDITION: With references.

STANDARD: So energy policies and procedures are adhered to.

PERFORMANCE STEPS:
1. Review references.
2. Inspect section's compliance with applicable energy regulations and restrictions.
3. Manage section's energy management program.
4. Report any situations that require reporting.
5. Conduct energy regulations compliance planning for unit field operations.
6. Provide input for unit SOPs and energy impact statements.

PREREQUISITE EVENTS:

RELATED EVENTS:
1120-ADMN-20xx
1302-ADMN-20xx
1310-ADMN-20xx
1330-ADMN-20xx
1390-ADMN-20xx

REFERENCES:
1. INSTALLATION SOP Installation's Standing Operating Procedures
2. MCO xxx TBD
3. MCO xxx TBD
4. MCRP xxx TBD

MISCELLANEOUS:

ADMINISTRATIVE INSTRUCTIONS: Initial training for this event is received in the xxx course (CID: xxx).

Source: Department of the Navy (DON). (2014). Utilities and engineer training and readiness (T&R) manual (NAVMC 3500.12B with changes 1–4). Washington, DC: Headquarters Marine Corps. *1120-ADMIN-2022, Enforce environmental regulations (p. 7–14) used as template

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APPENDIX H. CIVILIAN BILLET CLASSIFICATION CODES

OCCUPATIONAL GROUP	OCCUPATIONAL SERIES	TITLE	DESCRIPTION
0300		0300 – GENERAL ADMINISTRATIVE, CLERICAL, AND OFFICE SERVICES GROUP	This group includes all classes of positions the duties of which are to administer, supervise, or perform work involved in management analysis; stenography, typing, correspondence, and secretarial work; mail and file work; the operation of office appliances; the operation of communications equipment, use of codes and ciphers, and procurement of the most effective and efficient communications services; the operation of microform equipment, peripheral equipment, mail processing equipment, duplicating equipment, and copier/duplicating equipment; and other work of a general clerical and administrative nature.
	0301	0301 – Miscellaneous Administration and Program Series**	This series covers positions the duties of which are to perform, supervise, or manage two-grade interval administrative or program work for which no other series is appropriate. The work requires analytical ability, judgment, discretion, and knowledge of a substantial body of administrative or program principles, concepts, policies, and objectives.
	0343	0343 – Management and Program Analysis Series**	This series covers positions that primarily serve as analysts and advisors to management on the evaluation of the effectiveness of government programs and operations or the productivity and efficiency of the management of Federal agencies or both. Positions in this series require knowledge of: the substantive nature of agency programs and activities; agency missions, policies and objectives; management principles and processes; and the analytical and evaluative methods and techniques for assessing program development or execution and improving organizational effectiveness and efficiency. Some positions also require an understanding of basic budgetary and financial management principles and techniques as they relate to long range planning of programs and objectives. The work requires skill in: application of fact-finding and investigative techniques; oral and written communications; and development of presentations and reports.
0800		0800 – ENGINEERING AND ARCHITECTURE GROUP	This group includes all classes of positions the duties of which are to advise on, administer, supervise, or perform professional, scientific, or technical work concerned with engineering or architectural projects, facilities, structures, systems, processes, equipment, devices, material or methods. Positions in this group require knowledge of the science or art, or both, by which materials, natural resources, and powers are made useful.
	0801	0801 – General Engineering Series***	This series covers positions managing, supervising, leading, and/or performing professional engineering and scientific work. This series is applicable when the work of the position: -requires knowledge and skills in two or more professional engineering series within the Engineering and Architecture Group, 0800, and no one discipline is paramount; or -is consistent with engineering work in this occupational group, but is not covered by an established series in this JFS.
	0802	0802 – Engineering Technical Series***	This series covers technical positions that require primarily application of a practical knowledge of: (1) the methods and techniques of engineering or architecture; and (2) the construction, application, properties, operations, and limitations of engineering systems, processes, structures, machinery, devices, and materials. The positions do not require professional knowledge and abilities for full performance and therefore do not require training equivalent in type and scope to that represented by the completion of a professional curriculum leading to a bachelor's degree in engineering or architecture. Excluded from this series are positions that are specifically covered by a more specialized technical series.
	0808	0808 – Architecture Series***	This series covers positions managing, supervising, leading, and/or performing professional architecture work involving the art and science of conceptualizing, planning, developing, and implementing designs to ensure buildings and structures are: -responsive to human activities and needs; -structurally sound and permanent; and -economical to acquire, operate, and maintain.
1600		1600 – EQUIPMENT, FACILITIES, AND SERVICES GROUP	This job group includes positions the duties of which are to advise on, manage, or provide instructions and information concerning the operation, maintenance, and use of equipment, shops, buildings, laundries, printing plants, power plants, cemeteries, or other Government facilities, or other work involving services provided predominantly by persons in trades, crafts, or manual labor operations. Positions in this group require technical or managerial knowledge and ability, plus a practical knowledge of trades, crafts, or manual labor operations.
	1601	1601 – Equipment, Facilities, and Services Series***	This series covers two-grade interval positions that manage, supervise, lead, or perform administrative work that involves: -a combination of work characteristic of two or more series in the Equipment, Facilities, and Services Group where no one type of work is series controlling; or -other two-grade interval work classified in this group for which no other series has been established.

SOURCE
Handbook of Occupational Groups and Families
U.S. Office of Personnel Management
MAY 2009

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APPENDIX I. SAMPLE CIVILIAN POSITION DESCRIPTION

TITLE: Energy Management Specialist
REPORTS TO: AC/S, G-4 Officer
SUPERVISES: N/A

JOB FUNCTION: This position is responsible for administering a comprehensive energy management program for {insert USMC organization here}. Functional areas of responsibility include energy (electricity, natural gas & alternative fuels), water, and solid waste.

DUTIES AND RESPONSIBILITIES:

• Plans, organizes, coordinates and directs the base energy management program. Develops and implements short and long-range energy management goals and objectives. Recommends policies and procedures for effective, efficient, and economical operations.

• Develops and manages annual energy budget. Monitors changes in the {insert state or region} laws related to energy programs that affect the budget and operations.

• Develops energy management measures related to building heating/cooling, electrical usage, efficient irrigation practices, reclaimed water, and potable water conservation. Coordinates implementation of the utility management program with all site administrators.

• Studies and analyzes utilization of utilities and conducts energy audits at each regional base and ancillary facilities. Maintains energy consumption records and computerized database for all base operations. Compiles, reviews, and analyzes utility data. Prepares reports relating to utility management operations and program performance. Regularly disseminates utility consumption reports, conservation methods, and results to leadership, administrators, employees, Marines, tenant commanders, and the public (as required).

• Participates in renovation and new construction projects concerning the design of base & support facilities to ensure maximum resource efficiency and sustainable building practices. Ensures that air conditioning conversion projects provide the most cost effective design and construction. Optimizes the use of centralized energy & water control systems.

• Collaborates with the Maintenance and Operations Divisions for implementing measures to reduce energy usage and improve efficiency. Provides staff training and makes regular inspection of facilities for implementation of energy management measures.

• Promotes renewable energy and water resources whenever appropriate. Identifies opportunities for collaboration with other agencies and community partners to implement and promote smart energy initiatives. Coordinates and manages tenant command energy partnerships with local, state and other federal agencies.

• Promotes an improved resource conservation image of {insert USMC region here} throughout the community. Develops positive awards and publicity for successful resource management measures initiated by Marines, tenant commanders, administrators, and support staff.

• Coordinates with curriculum and instructional staff to promote use of energy programs as a teaching tool. Utilizes the resources of other Department of Energy and Department of Defense lessons learned as an integral part of the energy management program.
• Perform other duties as assigned.
• Maintain regular attendance.

PHYSICAL DEMANDS:
• Work is performed while standing, sitting and/or walking.
• Requires the ability to communicate effectively using speech, vision and hearing.
• Requires the use of hands for simple grasping and fine manipulations.
• Requires bending, squatting, crawling, climbing, reaching.
• Requires the ability to lift, carry, push or pull light weights, up to 30 pounds.

EDUCATION AND EXPERIENCE:
• Bachelor's degree in related field
• Master's degree in education, engineering, environmental science, resource management, public relations or business administration or related field (preferred).
• Five years of combined professional experience in management, energy &/or utility management, environmental services, engineering or equivalent experience in developing and implementing a public education program promoting resource efficiency (preferred).

LICENSES AND OTHER REQUIREMENTS:
• Knowledgeable about strategies for improving utility usage efficiency and concepts related to high performance school buildings.
• Current certification as either a Certified Energy Manager (CEM) or Certified Energy Procurement Professional (CEP) may be substituted for two years of the desired professional experience*.
• Managerial experience with increasing responsibility and demonstrated success.
• Demonstrated ability to communicate effectively orally and in writing with military personnel, design professionals, contractors, vendors and regulatory agencies.
• Proven expertise in organizing, analyzing, interpreting and evaluating relevant data.
• Documented experience with securing grant funds for related programs.
• Creative problem solving skills.

* The Certified Energy Manager (CEM) credential is recognized by the U.S. Department of Energy, the Office of Federal Energy Management Programs (FEMP), and the U.S. Agency for International Development, as well as by numerous state energy offices, major utilities, corporations and energy service companies.

Adapted from multiple online sources: 1) Job description: Energy management specialist. Retrieved from http://www.fcps.net/media/680655/energy%20management%20specialist.pdf; 2) Job code 8421: Energy manager job description. Retrieved from http://www.fcps.net/media/679995/engery%20manager%20(semp).pdf; 3) Newport News Public Schools. (n.d.) Job description: Supervisor I, Energy Manager. Retrieved from http://sbo.nn.k12.va.us/hr/jobs/descriptions/Energy_Manager.pdf

APPENDIX J. SERVICE ENERGY VISIONS

Army

"An effective and innovative Army energy posture, which enhances and ensures mission success and quality of life for our Soldiers, Civilians and their Families through Leadership, Partnership, and Ownership, and also serves as a model for the nation."

- Reduced energy consumption
- Increased energy efficiency across platforms and facilities
- Increased use of renewable/alternative energy
- Assured access to sufficient energy supplies
- Reduced adverse impacts on the environment

Navy

"Our Energy Vision is a Navy that values energy as a strategic resource; a Navy that understands how energy security is fundamental to executing our mission afloat and ashore; and a Navy that is resilient to any potential energy future."

- Assure Mobility and Protect Critical Infrastructure
- Lighten the Load and Expand Tactical Reach
- Green the Footprint

Air Force

"Make Energy a Consideration In All We Do. Achieving the Air Force energy vision involves establishing a clear picture of how energy impacts the Air Force's critical capabilities: Global Vigilance, Global Reach, and Global Power. Energy must be recognized as the base ingredient for Air Force missions and operations. By considering energy in every mission and organization, the Air Force can leverage energy as a combat enabler and increase its energy security posture."

- Reduce Demand
- Increase Supply
- Culture Change

Marine Corps

"To be the premier self-sufficient expeditionary force, instilled with a warrior ethos that equates the efficient use of vital resources with increased combat effectiveness."

- Instill an Ethos
- Increase Energy Efficiency in USMC Equipment and Installations
- Increase Use of Renewable and Alternative Energy

Source: Department of Defense (DOD). (2011). *Energy for the warfighter: Operational energy strategy.* (p. 12). Washington, DC: Assistant Secretary of Defense for Operational Energy, Plans, & Programs.

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APPENDIX K. OPERATIONAL ENERGY TASKS ON THE UNIVERSAL JOINT TASK LIST

SN 4 Provide Sustainment
DJS Approval Date: 09-JAN-15
Description: Sustain the necessary level and duration of military activity. JP 4–0 (primary), JP 4–09, CJCSI 3100.01B, DOD Operational Energy Implementation Plan, DoDD 4180.01
Notes: Maintain those levels necessary to support the national and/or military strategy. This task may include non-organic contract support. This task may include reducing the sustainment burden through improving operational energy performance and efficiency in sustainment operations.

SN 4.2 Provide Base Support
DJS Approval Date: 06-JAN-15
Description: Provide base support of wholesale logistics and administrative support. JP 3–28, JP 4–0 (primary), JP 4–10
Notes: This task includes the acquisition of materiel, facilities, and services. This support and these services can be provided directly to operational and tactical organizations as well as theater organizations. In austere and/or hostile and uncertain environments it is not practical or desirable for contractors to arrange for their own lodging, subsistence and facilities. The supported geographic combatant commander (GCC) has the authority to direct where the contractor authorized to accompany the force (CAAF) reside, within the terms and conditions of their contract, and generally are provided the same standard support as applied to personnel of similar grade or responsibility level. The military may consider providing the support, or at least directly coordinating this support to be within United States (US) and coalition bases. This task may include operational energy considerations, such as the use of insulating liners, reflective coatings, energy efficient lighting, centralized power systems, micro-grid technology, reduce fuel demand consumption and provide training. This task may also include integrating operational energy performance language in base support contracts (LOGCAP).

SN 4.2.5 Coordinate Base Operations Support (BOS)
DJS Approval Date: 30-JAN-15
Description: Coordinate provision of base operating support (BOS) functions. JP 4–0 (primary), JP 4–10
Notes: Base operating support (BOS) functions include personnel, equipment, services, activities, operational energy, and resources required to sustain operations at an installation and are typically managed by a base operating support integrator (BOS-I). The BOS-I coordinates the providing of local administrative and logistic services, including supply operations, maintenance of materiel, personnel support and services, base services, operation of utilities, maintenance of real property, minor construction, geospatial information and services support (formerly mapping, charting, and geodesy support), other engineering support, and administrative services (including network and

computer security and services, which involves protection of critical assets at both continental United States [CONUS] and deployed locations). This support is accomplished by or through activities of the supporting installation. Base operations services maybe provided by contract oversight planning. Base services also include transportation and electronic (signal) communications and weather support. Personnel support and services include personnel administrative services, finances, and resource management.

ST 4.2.1.1 Provide Contingency Contract Administration Services (CCAS)
DJS Approval Date: 06-JAN-15
Description: Provide contingency contract administration services (CCAS) for administering the Logistics Civil Augmentation Program (LOGCAP), Air Force Civil Augmentation Program (AFCAP), external support contracts, system support contracts and theater support contracts with place of performance in theater. JP 4–10 (primary), DOD Operational Energy Implementation Plan, DOD Strategy Energy for the Warfighter, DoDD 4180.01
Notes: Primary Contracting Officers (PCO) in-theater are typically responsible for theater contingency contract administration services (CCAS), while Defense Contract Management Agency (DCMA) is typically the combat support agency responsible for ensuring CCAS for major Department of Defense (DOD) acquisition programs. However, if delegated by a PCO in theater, DCMA may provide CCAS for selected external contracts. This task may include administration of U.S. property accountability and quality assurance during contingency operations. This task may include incorporating operational energy security considerations into contingency contracts.

Assistance (FHA)
DJS Approval Date: 21-APR-15
Description: Anticipate and respond to requests for foreign humanitarian assistance (FHA). JP 3–08, JP 3–29 (primary), JP 3–57, DoDD 5100.46, DoDI 3000.05, DoDI 6000.16
Notes: This task may involve relieving or reducing human suffering, disease, hunger, and/or privation. This task may also include arranging for assistance before, during, or after hostile action, to reduce the probability of loss of life or damage, minimize effects, and initiate recovery. Additional activities include surveying the disaster area, prioritizing needs, conducting health assessments, and providing health services, communications, shelter, subsistence, water, engineering support, transportation, firefighting, mass care, urban search and rescue (SAR), hazardous materials (HAZMAT) response, and energy distribution. This task is typically a Department of Defense (DOD) activity, normally in support of the United States Agency for International Development (USAID) or Department of State (DOS), conducted outside the United States (OCONUS). Other events may include natural or manmade disasters or other endemic conditions that occur OCONUS and its territories and possessions. This task may require language proficiency and/or regional expertise and cultural knowledge to effectively communicate with and/or understand the cultures of coalition forces, international partners, and/or local populations and/or understand the operational environment (OE). As a stated secondary objective of

foreign humanitarian assistance (FHA), information operations (IO) are executed to generate goodwill for the services rendered and a favorable impression of United States (US) activities.

OP 4.2 Synchronize Fuel Supply
DJS Approval Date: 20-JAN-15
Description: Direct the integrated bulk petroleum supply chain to point of use in order to sustain theater operations. JP 4–01.5, JP 4–03 (primary), CJCSI 3126.01A, DoDD 4140.25-M, DOD Operational Energy Implementation Plan, DOD Strategy Energy for the Warfighter
Notes: Although bulk petroleum is a common item of support, it presents a significant logistic challenge in its movement, storage, and distribution. Providing forces with the right fuel, in the right place, and at the right time involves synchronizing activities, determining peacetime and wartime requirements, prioritizing delivery, contracting and allocating product, arranging for bulk storage, moving products forward to and within the theater, ensuring quality control, issuing and accounting for the fuel, and maintaining distribution equipment and facilities. Joint Theater Petroleum Management is inclusive of military and commercially based petroleum distribution. This task includes joint petroleum support planning, assessing joint operational area petroleum status, and obtaining, maintaining and providing joint petroleum situational awareness. This task may require language proficiency and/ or regional expertise and cultural knowledge to effectively communicate with and/ or understand the cultures of coalition forces, international partners, and/or local populations and/ or understand the operational environment. This task may include integrating alternative fuels into supply mix, expanding operational energy supply alternatives, making alternative solutions necessary, and anticipating potential environmental and other issues associated with fuel usage.

Source: Joint Electronic Library. (2016). Universal Joint Task List. Retrieved from http://www.dtic.mil/doctrine/training/ujtl_tasks.pdf

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